

ARCHIVES OF OTOLOGY.

SOME POINTS RESPECTING THE SURGICAL ANATOMY OF THE FACIAL NERVE.¹

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THE portion of the facial nerve which chiefly concerns the otologist, when he meditates a surgical attack upon the ear and structures adjacent to it, is that lying between its entrance into the internal auditory meatus and its exit through the stylo-mastoid foramen. A terse, as well as comprehensive, description of the course of the facial nerve between these two landmarks is given by Morris who says: "It enters the internal auditory meatus in company with the pars intermedia and the eighth nerve. As it lies in the meatus it is situated above and in front of the eighth nerve, from which it is separated by the pars intermedia, by sheaths of both the arachnoid and the dura mater and by prolongations of the sub-arachnoid and subdural spaces. While it is still in the meatus it is joined by the pars intermedia, and thus the trunk of the seventh nerve is formed. At the outer end of the canal the trunk pierces the arachnoid and the dura mater and enters the aqueduct of Fallopius, in which it runs forwards and slightly outwards to the hiatus Fallopii, where it makes an angular bend, *the external genu*, round the anterior boundary of the vestibule, and is enlarged by the formation of the geniculate ganglion on its anterior border. From the external genu it runs backwards in the aqueduct along the outer wall of the vestibule and the inner wall of the tympanum, above the fenestra ovalis, to

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the junction of the inner and posterior walls of the tympanic cavity; then, bending downwards, it descends, in the posterior wall, to the stylo-mastoid foramen."

The writer, with a view to satisfying himself in regard to certain relations which the facial nerve bears to neighboring parts, boiled a number of temporal bones until the soft tissues were entirely disintegrated, and, after drying thoroughly, injected the facial canal through the stylo-mastoid foramen with a boiling solution of carmine in beeswax, which quickly cooled and solidified after coming in contact with the cooler bone. Two approximately horizontal sections were then made with the saw, one on a level with the spina supra-meatum, and the other with the floor of the orifice of the osseous external auditory canal as nearly as that could be determined. Eighteen adult bones were selected as having been prepared with sufficient care, and offering correct data because of this, for examination.

A close scrutiny for dehiscences, as evidenced by the extrusion of the colored wax through the bony envelope of the canal, revealed only one probable and one doubtful deficiency in the wall of the facial canal where it lies within the mastoid process; this is as was to be expected, for in all the specimens there existed a condensation of the bony tissue around the facial canal in this region, in the majority being truly compact in character, but in a few bones showing simply a much denser cancellous structure than in the cellular parts of the mastoid. Seven marked and two dubious dehiscences, in as many bones, were discovered as a result of the examination of that portion of the facial canal bordering on the cavities of the middle ear; all of these were in the neighborhood of the fenestra ovalis. No dehiscences were discovered in the bony wall between the facial canal and the labyrinthine cavities. It is not necessary that this proportion of dehiscences to bones examined should be maintained in further investigations for us to be amazed at the infrequency of the occurrence of facial paralysis as a complication of middle-ear inflammations when we consider how favorably disposed the nerve lies for injury.

The next point investigated was the distance existing

between the internal surface of the external wall of the facial canal and the spina supra-meatum—in other words, between the facial canal and the spine. The average measurement for all eighteen bones was found to be 15.9mm, the minimum was 14.2mm, and the maximum 20mm. Noltenius, as the result of an examination of twenty-two bones by means of horizontal sections, found the average distance between the supra-meatal spine and the canal for the facial nerve to measure 15.5mm, the minimum being 11mm. Combining these results will give an approximate average of 15.7mm, with a minimum of 11mm.

The distance between the internal surface of the external wall of the facial canal to the posterior-inferior angle of the external margin or orifice of the osseous external auditory canal was next measured by means of the second horizontal section made as above described. The average distance was found to measure 12.1mm, the minimum measurement not exceeding 7.5mm. This external point of measurement was selected because it is left untouched in the operative field longer than any other portion of the external surface of the mastoid apex.

It follows from these findings, supposing them to be approximately correct, that we may feel warranted not only in bravely attacking the bone along the level of the spine up to a depth of 11mm, but also on a level with the floor of the outer orifice of the external auditory canal up to a depth of 7.5mm. Beyond these distances we must proceed with extraordinary care, using all the accessories in the way of illumination, hemostatics, and instrumentation that are given us.

The facial canal in its vertical portion was found to be at an average distance of 3.5mm from the nearest point of the posterior edge of the annulus tympanicus, the minimum measurement being 3mm. Examining now the sulcus internal to the posterior edge of the annulus tympanicus, which sulcus forms the lower portion of the posterior tympanic wall, and we find that the distance between the tympanic cavity in this region and the nearest portion of the descending arm of the facial canal averages only 1.4mm

with a considerable number of the specimens not exceeding the minimum measurement of .5mm by any considerable margin. These two regions, the posterior edge of the annulus tympanicus, and the posterior tympanic wall, are frequently involved in carious processes which have also affected the larger ossicles, especially the incus, and in which the perforation of the membrana tympani is in the posterior superior quadrant or in the posterior half close to the annulus—in fact, the posterior edge of the perforation is usually formed by the annulus. The adjacent cutaneo-periosteal lining of the inner posterior external canal wall by its swollen, congested, and tender condition gives evidence of the underlying pathological process; the posterior free edge of the annulus and the sulcus behind it are covered by more or less exuberant granulations, and a cholesteatomatous condition is apt to affect the neighboring portions of the middle-ear cavity. Imagine the ease with which the pathologic process or the curette of the surgeon can break down the defensive wall!

The wax injection failed to make its escape from the aqueduct of Fallopius into the internal auditory canal, notwithstanding that it did escape from the hiatus Fallopii into the middle cerebral fossa in seven of the specimens, and would probably have done so in all had an injecting material been used that could have been more easily liquefied or that would have remained so longer. This fact certainly indicates that mechanically the track of any infection passing from the mastoid or middle ear along the facial canal is an easier and more direct one towards the middle cranial fossa than towards the internal auditory canal and thence into the posterior cranial fossa. Apropos of this, it is interesting to recall to your mind the statement of Macewen that inflammation may thus extend along the perineural sheaths to the middle cranial fossa from the middle ear, passing thus along the facial and then along the greater superficial petrosal nerve to the anterior surface of the petrosal bone. Also, Hilgermann's report of six cases of involvement of the Gasserian ganglion in middle-ear suppuration may have a bearing on this anatomical configuration of the parts. The

following case is selected as fairly typical (*Year-Book of Eye, Ear, Nose, and Throat*, 1902, p. 184).

W. M., thirteen years old, had after measles, at the age of four, a discharge from the left ear. During the last two weeks the otorrhœa was accompanied by headache, fever, vomiting, vertigo, with a tendency to fall to the right. On admission, the temperature was 39.8° C. and the pulse 88 to 100. The head was held more or less in a fixed position, though all movements were passively possible without pain. The anterior and posterior margins of the mastoid were very tender, as well as the insertion of the sterno-mastoid muscle; the canal was filled with fetid pus which accumulated rapidly.

Operation.—The antrum was opened and the mastoid cells were found filled with pus; the antrum contained pus and granulations; the tegmen tympani seemed solid; the sinus and dura of the middle fossa were exposed; both appeared healthy, though the bone on the posterior surface of the antrum appeared softened. The sinus was incised but contained fluid blood. Distinct rigidity of the neck continued; high fever and other marked meningeal symptoms ensued, and the patient died the following afternoon.

Autopsy.—Extensive meningitis, sinus free. On examining the apex of the pyramid, the Gasserian ganglion was found bathed in pus. On retracting the dura in the region of the fovea, the dura could not be recognized as such, but was replaced by soft granulations. At this place, a very delicate connective-tissue band, perhaps a nerve, perforated the bone and passed into the cavity mentioned below. The ossicles were normal and imbedded in hypertrophied mucous membrane. From the floor of the hypo-tympanic recess, a system of pneumatic spaces filled with pus and granulations passed inward between the jugular fossa and the labyrinth, then proceeded inward and forward to the apex of the pyramid. The previously mentioned thin area of bone at the fovea trigemina corresponded to the inner wall of a large air cell which surrounded the carotid canal and was filled with pus. Evidently the inflammation passed along the delicate fibrous band to the cavity of the Gasserian ganglion.

Bearing the known relations of the facial canal and the limits of safety in measurements in mind, it should not be difficult for the careful operator to do the ordinary Schwartze operation indicated in acute cases without endangering the facial nerve, unless the bony wall of the facial canal has been pathologically destroyed and its place taken by granulation tissue and purulent debris, thus disguising the presence of the facial nerve and exposing it to instrumental attack. Such exposure of the nerve does not necessarily result in an inflammation of the nerve with a consequent impairment of function. Our findings in regard to the great frequency of the occurrence of dehiscences also indicate the great power of resistance that is exhibited by the exposed facial nerve. Notwithstanding the great number of cases of acute and chronic inflammation of the middle ear seen by us, the occurrence of a complicating paralysis of the facial nerve is a matter of considerable rarity. Its occurrence after a surgical attack is not a matter of such proportional rarity.

In removing the larger ossicles or on curetting the tympanic cavity to remove granulation tissue and carious bone, two regions especially should be treated guardedly. There is reason to fear the forcible use of the incus extractor, whether hook or curette, in the region just above the oval window and backward from this toward the floor of the aditus. The other region is that forming the bony posterior wall of the tympanic cavity and adjacent portion of the annulus. Curettage here or removal of the annulus by any other means is certainly fraught with great danger to the facial nerve. Luckily, should such an accident take place while curetting, the nerve is rarely entirely severed, so that the outlook for ultimate recovery of power is much better; though even when the nerve has been completely cut through by disease or surgical interference, there still remains a hope of regaining control over the paralyzed muscles. It is in doing the so-called radical operation that the greatest danger to the nerve exists, which danger is so much the less the greater the skill and knowledge of anatomy possessed by the operator,—great carefulness is needed even by such to guard the patient from an injury which may leave lifelong

disfigurement. Preferably crowd into the sinus wall or into the wall of the middle cranial fossa rather than jeopardize the integrity of the facial nerve. It is thought that with all care and in cases in which we are sure that we have not trespassed upon the confines of the facial canal, we sometimes shall see the nerve affected after a period of days following the operative attack. Having then avoided the nerve in the mastoid and attained the antrum, the same care must be exercised to prevent injury to that portion of the nerve lying near the tympanic cavity. Stacke's protector should be used with all gentleness, and it is a question whether it would not be better to discard it in removing the outer wall of the aditus and attic and use as a substitute gauze packing passed into the aditus and carried along into the attic as the bone is removed. The contrivance of a compact, strong and efficient bone punch similar to Dench's, working from within outwards, to remove the bridge of bone, is eminently to be desired; those already designed have the disadvantage of slipping under certain conditions and in lacking the necessary rigidity and strength for the work. Possibly the new punch recently devised by Kerrison may meet the requirements; the writer has not as yet had an opportunity to try it.

The facial nerve at its exit through the stylo-mastoid foramen may be endangered by the attempt to expose the sigmoid sinus downward and inward toward the bulb of the jugular; the operator should aim to keep well back of the anterior margin of the apex of the mastoid.

A CASE OF CHRONIC PURULENT OTITIS WITH
CHOLESTEATOMA AND NUMEROUS ENDO-
CRANIAL COMPLICATIONS—OPERATION—
RECOVERY—WITH REMARKS UPON THE
DIAGNOSTIC VALUE OF LUMBAR PUNC-
TURE.

By DR. ARNOLD KNAPP, NEW YORK.

K. W., sixteen years of age, suffered from double purulent otitis after scarlet fever at six. After this the hearing gradually failed and now she is totally deaf. She has also passed through an attack of interstitial keratitis, and she presents the typical saddle-shaped nose and teeth characteristic of inherited syphilis. She was treated in the dispensary for the chronic purulent otitis with cholesteatoma, and the adenoids were removed. During the past year she had suffered from pain in the left ear and vertigo. One week ago after taking cold she became quite ill with chills, nausea, and severe headache.

On admission, February 6th, the left canal was found narrowed and filled with fetid pus. There was a well-marked and very tender swelling over the left mastoid. T. 101.6°, P. 140.

The operation was immediately undertaken, and an incision over the swelling evacuated pus under the periosteum. A fistula was found in the mastoid fossa, which led into a large cavity occupying the entire mastoid process. The sinus and neighboring dura were bare and covered with granulations. The sinus seemed soft. The inner extremity of the posterior bony wall was partly destroyed, making a broad communication with the tympanum and auditory canal which was occupied by a cholesteatoma and granulations. There was a large central defect in the external semicircular canal, which contained granulations. The tegmen antri appeared healthy except on close examination. A small

thread of dura-like tissue protruded, and a very minute quantity of pus appeared. After removing the tegmen some more pus was encountered. The opposing surface of the dura was covered with apparently healthy granulations. The entire region was carefully inspected with a probe, but no fistula was found. The wound was packed and kept open. After operation all the symptoms disappeared and the subsequent course was uneventful.

Two weeks later the patient was again put under ether and a Panse meatoplasty was performed. Granulations were removed, and there had been some recurrence of cholesteatoma in the tympanum. After another week the patient was discharged and returned regularly for dressings.

On March 4, 1904, granulations in the depth of the wound were curetted. That evening on returning home she complained of a chill and headache, and vomited. She passed a very poor night, and on the following day she was very ill, complaining of pain in the lower extremities. On the 6th and 7th, no further chills but very restless, though sensorium was normal. Nausea and headache.

Re-admitted on the 8th. T. 104° , P. 100. She appeared very ill, was restless, and complained of pains in head and lower extremities, but was not unconscious. Slight twitching, head drawn back, very averse to being moved. Very thirsty, swollen lips, vomited. The wound was dressed and found clean. There was no fistula to be seen. Lumbar puncture evacuated a very turbid fluid. This was examined microscopically for bacteria, but none were found. Subsequent culture of the same fluid proved it to be sterile.

On March 9th to 12th the temperature gradually came down to 100° – 101° , P. 90–100. She was restless, nauseated, complained of left-sided headache, and pain in the legs. She was conscious and took nourishment. Eyes normal. No change in the wound.

A gradual general improvement thereupon followed; the temperature became normal on the 19th, and on the 26th of March she went home.

The wound in the ear rapidly healed, except a small focus near the oval window from which a small polyp was removed from time to time, and her convalescence was uninterrupted.

On May 24th the ear was dry and she was apparently in much better health than she had enjoyed in years.

Remarks.—The case is of interest from a number of stand-points. Owing to the girl's very poor physical and mental condition, and as the cholesteatoma did not cause any marked symptoms, the radical operation was not insisted upon during her attendance at the dispensary. During the preceding two years she came only irregularly until the day when the operation was found necessary. She presented then all the symptoms of an acute retention of pus in the middle-ear cavities, and appeared so ill that we were prepared for an intracranial complication.

The operation showed, beyond the cholesteatoma and the large accumulation of pus in the mastoid, an extradural abscess in the middle cranial fossa, caries of the labyrinth, with granulations and pachymeningitis in the posterior fossa. As no fistula or lesion was found in the dura suggestive of a deeper trouble, an exploration of the brain was not made.

The symptoms were all relieved and the subsequent course was uneventful until, after curetting the granulations in the depth of the ear, one month after the first operation, the patient became very sick with high fever, great restlessness, some delirium, pain in the head and in the lower extremities, rigidity of the neck, and vomiting—all symptoms suggestive of meningitis. This appeared to be still more confirmed when the lumbar puncture elicited an extremely turbid fluid containing many leucocytes. The condition of the patient was so critical and the diagnosis of purulent meningitis so probable that an operation was not considered advisable. The examination for bacteria in the specimen of lumbar fluid, both by cover slide and by culture, proved negative. Much to our surprise, the case slowly improved and proceeded to recovery.

It seems probable from the conditions found at operation that the labyrinth was very much affected and that the disease extended to the meninges or a localized meningitis was present. The removal of the granulations then started up a meningeal infection which was not, however, of a virulent type.

In Halle, where they systematically perform lumbar punc-

ture and lay considerable prognostic stress upon the results of the examination of the fluid, they no longer regard turbidity of the lumbar fluid alone as an evidence of a diffuse purulent meningitis and a contra-indication to operation, but demand the additional presence of bacteria (Schultze, "Beitrag zur Lehre von der otogenen Meningitis," etc., *Archiv f. Ohrenheilkunde*, lviii., p. 14, 1903). On the other hand, Gruening, in a recent meeting of the New York Otological Society (these ARCHIVES, vol. xxxiii., p. 224), reported the case of a young boy who exhibited meningeal symptoms and where the spinal fluid was opaque and contained streptococci and the boy recovered.

THREE CASES OF TUMOR OF THE EAR.

BY DR. GERBER, KÖNIGSBERG.

(With two illustrations on Plates I. and II., *Zeitschrift f. Ohrenheilk.*, Vol. XLV., No. 1.)

Translated by Dr. ARNOLD KNAPP.

I.—FIBROMA.

C. A., seventeen years of age, of healthy family, has always enjoyed good health. The present illness began with the appearance of a small pimple on his left ear a year and a half ago, which did not produce any pain or other symptoms. Recently it has enlarged so that the ear is somewhat longer than normal. There are occasional hemorrhages from the tumor.

The patient is a small, pale, otherwise healthy-looking individual. The left auricle is to its greatest part hidden by a tumor as large as a plum, which rises with a rather broad base directly below the helix and covers the anti-helix, the spine of the helix, the concha, and the entrance to the auditory canal. It extends to the lobule and projects externally and posteriorly beyond the auricle. The tumor is ovoid in form, about 4cm long and 2½cm broad. It is movable, and its base measures 5-7mm. The covering of the tumor, which above is distinctly noticeable as the continuation of the integument of the external ear, presents in its lower half a white, horny, wart-like appearance. The epidermis on the lower two-thirds is partly macerated, and is replaced by scab, blood-clot, and excoriations. The tumor is uniformly hard. (See Figure 1.)

Examination of the rest of the ear shows normal conditions. There are no glandular swellings.

Enucleation of the tumor took place under local anæsthesia

by curved incisions surrounding the root. The cartilage is exposed and found perfectly normal. Suture. Primary union. A relapse has not occurred up to the present day—that is, after four years. Histologic examination showed a dermoid tumor composed of fibrous connective-tissue with few blood-vessels, elastic fibres, and distinct round-cell infiltration on the surface.

True fibromas of the external ear are rare. They are most frequently observed in the lobule, where they arise after puncture for ear-rings and other traumatisms.

Fibromata at other parts of the auricle are extremely rare. They have been described by Habermann, Steinbrügge, and Anton.

This tumor is interesting not only on account of its localization, but also on account of its size.

II.—TUBERCULOMA.

A. W., twenty years of age, claims always to have enjoyed good health. The father is living and healthy. Four brothers and sisters are also well. Two died early. The mother died from a pulmonary affection at the age of forty-one. During the past year the patient has had transient attacks of hoarseness, which did not, however, require medical aid. Since earliest childhood her immediate family have always noticed an enlargement of the left lobule. This enlargement was at first small, gradually increased, and was only painful on palpation at intervals. After a blow it sometimes bled freely. The surface would then present small elevations and turn bluish red. For a long time she has had no further symptoms, and only comes to have the tumor removed for cosmetic reasons.

The patient is a strong, healthy-looking girl. The physical examination showed no abnormality. The left auricle presents a uniform enlargement of the lobule, which has about the size of a small walnut. The contours are, however, normal, and the color is normal. The consistency is that of the normal lobule. The lobule has been punctured for an ear-ring just as the one on the other side. No glandular involvement.

This was evidently not a heteroplastic growth but a tumor consisting principally of hypertrophic normal tissue, and I regarded the condition as one of macrotia.

Under chloroform narcosis the lobule was resected, and it was

attempted to shape the contours exactly like those of the other ear. Pathological tissue was encountered at no place. It was possible to obtain a very good cosmetic result.

Histological examination of the excised piece showed the typical picture of cutaneous tuberculosis: a not particularly fibrous connective-tissue with round-cell infiltration, many epithelial cells, and several giant-cell tubercles.

Tuberculosis occurs in the auricle in the lupus form. True tuberculosis is very much more rare, and occurs in the form of miliary cutaneous tuberculosis with ulcers, or as perichondritis, or as nodular tuberculosis, as has been described by Eiselsberg and Haug. In all of the cases of this last category, the lesion was the result of an inoculation during puncture of the lobule—in other words, a vaccination tuberculosis.

The striking features of this case are that a puncture had not been made in the lobule, and that the nodules appeared without apparent cause in an otherwise healthy girl.

III.—CARCINOMA.

J. A., forty years of age. His father died at the age of sixty-three from phthisis. The mother died at fifty-eight from unknown cause. The patient himself, though delicate, has always been healthy. He has passed through no particular illness and does not remember the onset of the present right-sided otorrhœa, which has existed since childhood. He has never had pain in the ear up to within a year. Then the right auditory canal swelled up and severe pain was experienced. He was operated upon with some improvement in his condition. After three months the same pain recurred with some occlusion in the right ear. About a month ago a growth formed behind the ear, which rapidly increased to the size of a fist.

The patient is a medium-sized, sparely-built man of fair condition of nutrition. The innervation of the right half of the face is normal. Hearing right. Whisper and ordinary voice zero. Weber lateralized to right. The external canal is filled with lobular, hard brownish masses of granulation tissue, which apparently originate from the entire circumference of the canal. Attempt at probing caused profuse hemorrhage. The auricle up to the thickened lobule is normal.

Directly behind the auricle, there is an enormous tumor mass extending from the attachment above the auricle down to the neck. The upper parts of the tumor are covered with red and bluish shining skin. In the lower parts, the integument is excoriated and covered with black clots and fresh blood. The tumor measures about 9cm by 5cm. Its consistency is a distinctly fluctuating one, while below it is soft. (Figure 2.)

There are a number of small, hard cervical glands to be felt on the right side. A small particle of the tumor was removed from the auditory canal and examined histologically, and proved to be typical epithelioma.

The tumor behind the ear was regarded as in part a hematoma probably originating from erosion of a vessel by the tumor process.

As the patient insisted upon operation notwithstanding that the danger had been fully explained to him, an incision was made 2cm behind the insertion of the auricle over the entire tumor. The knife cut as through butter, and a large cavity was entered, filled in part with blood coagula and partly with granulations. After careful removal of these masses, a triangular defect was found in the bone, with its base towards the posterior auditory canal and the apex directed towards the posterior cranial fossa, measuring about 2cm horizontally and 3cm vertically. The posterior membranous canal is infiltrated with tumor nodules. The antrum and surrounding cells are filled with granulations and some pus. The attic and tympanum are in the same condition. There are no ossicles. The posterior wall of the tympanum, the prominence of the horizontal semicircular canal, and the facial nerve show normal conditions. After removal of the granulations from the upper wall of the antrum and of the attic, a large defect is visible, exposing the dura of the middle cranial fossa. The dura itself appears perfectly normal. On attempting to remove the bone posteriorly, a copious hemorrhage occurred, evidently coming from the sinus. Packing and dressing applied.

The subsequent course was uneventful, and four months after the operation the patient died of debility.

Carcinoma of the ear belongs to the rare tumors, if we exclude the frequent isolated carcinomas of the auricle. In 3365 autopsies, Müller found 128 carcinomas, of which not

one belonged to the ear, nor to the nose. The external and internal nose appears to have the same relation to carcinoma that the external and internal ear does. There is one case of carcinoma to from 5 to 10,000 other ear-diseases. Recently the reports of this condition of the ear have become more frequent, and there are probably 40 to 50 such reports. Zeroni says correctly that the reported cases corresponding to the rarity of the disease are not sufficiently frequent, so that it is not superfluous to report additional cases, even though they do not present any unusual features.

This clinical case does not differ from the chief monographs on the subject. It also occurred in a patient who was over thirty and who suffered from chronic purulent otitis, and the right ear also was affected.

The origin of the tumor cannot in this case be definitely determined as is the usual condition, though the histological examination and the method of extension, together with the non-involvement of the facial nerve, show the external auditory canal as the probable origin.

It is especially interesting to me to note the resistance which the posterior auditory canal wall and the posterior tympanic wall offered to the tumor. Thus there was no facial paralysis notwithstanding extensive involvement of the bone in the mastoid process, in the squama, and so forth.

The resistance offered by the dura to infiltration with tumor masses has been previously commented upon.

Especially noticeable are the enormous size of the tumor, and the hemorrhage, which is presumably directly responsible. The origin of the hemorrhage could not be distinctly determined. The sinus wall was not infected, and the formation of a thrombus had not taken place up to the time of operation.

Though it was impossible to remove all of the tumor, on account of the hemorrhage from the sinus, we should at least be able by operation, as in operations in other regions, to exercise a retarding influence upon the farther development of the tumor. This, however, has only been accomplished by Jansen in one case.

ANGINA AND PHLEGMONOUS PHARYNGITIS
FOLLOWED BY PURULENT THROMBOSIS OF
THE CAVERNOUS SINUS AND PURULENT
BASILAR MENINGITIS.

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Translated from *Zeitschr. f. Ohrenheilk.*, Vol. XLIV., p. 225.

THIS case illustrates the fact that severe septic processes, which may lead to dangerous complications and death, may be associated with an apparently harmless catarrhal angina.

The patient was a servant, nineteen years of age, who had been taken ill three days before with pain in the neck and difficulty in swallowing, and now complained principally of severe headache.

On admission, June 30, 1902, a well-built woman with high fever. The right cheek presented a striking red swelling extending to the upper margin of the zygomatic arch and back to behind the right ear. The ear itself was normal, the right mastoid process slightly tender. Right catarrhal conjunctivitis. The pupils uniform and react promptly. Normal eye-grounds. The pharyngeal structures are the seat of an intense inflammation. They are very much swollen and very red. There is no exudate. The right half of the soft palate is swollen without apparent fluctuation. The posterior pharyngeal wall is swollen and red without any collection of pus. The speech is that of swollen tonsils, and there is a moderate inflammatory ankylosis of the jaw. The glands at the angle of the jaw are somewhat enlarged. The jugular veins present no abnormality. The other organs are normal, especially the heart and kidneys.

A broad incision was made into the soft palate without evacuating any pus. Ice applications were made to the head and the neck.

June 31st.—T. 40° C. P., 124. In the course of the day the headache and pain in the back of the neck increased. There was more swelling in the region of the right cheek and behind the right ear. Paracentesis of the right *Mt* was to-day performed because the drum membrane was slightly clouded and injected, but without evacuating any pus. There was slight protrusion of the right eyeball, with swelling and œdema of the lids. The right pupil was larger than the left. Both are round and react promptly. The first branch of the fifth nerve on the right side is tender. There is no change in the condition of the throat.

July 2d.—T. 39° C. P., 136, R. 38. Both eyes are protruded. Chemosis of both conjunctivæ. The right pupil remains larger than the left, though they react promptly. Eye-grounds: the disks are sharply defined, somewhat pale, with well-filled vessels. There are no inflammatory changes. The swelling of the right half of the face has increased. The top of the right mastoid process is tender, as well as the region of the mastoid emissary. The right *Mt* is clouded, reflex preserved. Another paracentesis is performed without result. In the throat the wound from the incision is somewhat infiltrated. There is moderate discharge of thick pus containing streptococci in pure culture. The right half of the soft palate is still very prominent. The posterior pharyngeal wall is very much inflamed, and is incised without producing any pus. The jugular veins are normal. The patient is somewhat stupid and complains of headache and rigidity of the neck. Repeated vomiting. Hard, slow pulse. Abdomen soft. Peculiar rhythmic oscillation of the head.

July 3d.—Pronounced meningitic symptoms. The eyes protrude still more with increased chemosis. Catarrhal râles over both lungs. Moderate expectoration. There is no abscess to be felt in the neck. The pharyngeal structures are very swollen. There is considerable purulent discharge from all the incisions.

The force of the heart gradually failed and the patient died on July 4th.

Autopsy.—After removal of the skull-cap, the dura was found tense. The vessels contained fluid blood. The longitudinal sinus and the two transverse sinuses contained fluid

blood. After removal of the dura, the pia on the convexity presented a dilated condition of the blood-vessels. At the base, in the region of the optic chiasm, and on the surface of the cerebellum there is a purulent exudate. After removal of the brain, the dura in the middle fossa is clouded and covered with a multitude of fine red spots.

The base of the skull is then removed in connection with the organs of the throat. On the right side, the Gasserian ganglion is surrounded by a purulent fluid. The cavernous sinus is thrombosed and contains a grayish-yellow coagulum firmly adherent to its walls. All of the vessels emptying into the sinus are in this same condition. On both sides, the ophthalmic veins were found filled with pus. Cross-sections through the orbits showed that the optic nerves were free from pus and that the maxillary sinuses were empty. The upper region of the neck and the buccal cavity are swollen and as hard as a board. The large arteries and veins contain fresh blood coagula. The mucous membrane of the tongue and of the pharynx is discolored blackish-green, and covered with an exudate. The tonsils are also discolored, and very swollen. The right one is as large as a walnut and soft on pressure. This has constricted the opening into the throat to such an extent that a finger can scarcely be passed into the œsophagus. The epiglottis is grayish-black and covered with an exudate. The entrance into the larynx normal. The laryngeal and pharyngeal mucous membrane is swollen and contains tenacious mucus.

There are small abscesses in the apices of both lungs. In the rest of the parenchyma there is a disseminated hemorrhagic inflammation of the lungs. The heart is normal; the peritoneum somewhat glistening. In both kidneys, numerous septic emboli. The kidneys, the liver, and the spleen are all enlarged.

This is unquestionably one of the cases which Senator first described as acute infectious abscess of the pharynx, and which were later fully described by Felix Semon as acute septic inflammation of the pharynx and of the larynx. According to the first author, this is an acute infectious disease, consisting of a phlegmonous inflammation of the

pharyngeal mucosa, and which with symptoms suggestive of a severe sepsis usually leads to death after the onset of laryngeal œdema. Semon includes these cases of Senator's, but includes also erysipelas of the pharynx, most cases of angina Ludovici, and the infectious angina of the French, as all of these start from the same infectious agent. In all, the severe, often fatal, course with septic symptoms and the tendency of the processes to extend either per contiguity or by septic emboli is marked. The inflammation usually extends downwards. A case has been reported by Stein of phlegmonous angina which was followed by purulent meningitis.

Though in our case, through the complication with sinus thrombosis and meningitis, the disease and its course were somewhat obscured, it cannot be denied that from the very onset the infection was a particularly virulent one. The patient on admission was very ill, though she had enjoyed perfect health three days before. In addition to the intense inflammation of the pharyngeal structures, there was marked swelling of the right half of the face, which probably indicated the early involvement of the cavernous sinuses. There was no exudate found in the mouth.

According to the autopsy, the purulent inflammation presumably extended along the delicate veins which pass from the venous pharyngeal plexus through the base of the skull to the cavernous sinus. The pharyngeal plexus and the entrance of the veins into the cavernous sinus were both found at the autopsy filled with pus. Other paths of infection between the purulent condition in the pharynx and the cavernous sinus could not be discovered, so that it is very probable that the process took its course along these veins.

More frequently, in cases where purulent meningitis follows an abscess in the mouth and pharynx, the path chosen is by way of the sphenomaxillary fossa, the foramen rotundum, the Vidian canal, and the inferior orbital fissure. Scheff speaks of an extension of a purulent inflammation from the roots of the wisdom teeth to the meninges by this path. This same course is mentioned in Roser's *Topographical Surgery* and in Weber's *Surgery*.

TWO CASES OF ABSCESS OF THE TEMPORAL LOBE OF THE BRAIN.

BY DR. F. VOSS, RIGA.

Translated from *Zeitschr. f. Ohrenheilk.*, Vol. XLIV., p. 275.

Case 1.—Brain abscess after acute otitis media.

P. S., forty-two years of age, laborer, fell from a framework six weeks ago, striking the left side of the head, and remained unconscious. There were bleeding from the ear, severe vertigo, vomiting, and pain in the surrounding parts of the ear, which kept up for about two weeks, when the vomiting and the vertigo ceased. The pain, however, became more severe, especially behind the ear. The ear was dry for three and a half weeks and then began to discharge profusely, associated with vertigo. The patient was often delirious at night, and complained of loss of memory. Four days before admission to the hospital the pain became suddenly very severe. The patient was unconscious and there were convulsions. The last two days his condition has been somewhat better, but at night he cannot sleep.

January 8, 1902.—The patient is a medium-sized, heavily set-up man, who became very much excited during the examination, talked a great deal, and moved about constantly. There was nothing abnormal in the lungs or in the heart. Pulse, 80, irregular; temperature, 37.2° C. The facial nerve was intact; rather profuse purulent discharge from the left ear. The mastoid process is externally unchanged but tender on pressure. The canal is wide and not swollen; the perforation was below and as large as the head of a pin. Eye-grounds normal.

On January 9th the condition was unchanged, the symptoms were the same, the temperature rose in the evening, and at night the patient was delirious.

January 10, 1902, operation.—Moderate pus in the antrum. The posterior wall appeared rough. The middle cranial fossa was then exposed, and a cavity in the bone was found $1\frac{1}{2}$ cm large, filled with granulations and pus. After removal of the granulations and pus, there were a small uninjured vein and an artery to be seen passing over the exposed portion of the dura. The wound was packed.

The temperature dropped in the evening, and on January 12th fell to 36.8° . There was no pus. The sensorium was free, and there was no further vertigo. On January 13th, however, the temperature again rose, the pain became more severe, and there was slight delirium. At dressing, the wound was found entirely healthy. Vomiting.

January 14th.—Temperature varying between 37.7° and 39° . The patient was quite stuporous, with violent delirium. At the dressing the dura was incised and the knife passed in various directions without any result. The points of puncture bled freely. Packing. The pulse was never under 80, and varied between 80 and 90. On January 15th the temperature fell; the pulse rose to 104 and became irregular. Great restlessness. Death ensued on January 17th.

Autopsy showed the presence of an abscess as large as a cherry in the lower surface of the temporal lobe, filled with thick, yellowish-green, fetid pus. The scalpel had passed by at a distance of 2 cm. The surrounding parts of the brain were infiltrated with pus and softened. The abscess had perforated into the ventricle. The sinus was normal, and there was no fracture of the base.

Remarks.—Three and a half weeks after a fall on the head, with unconsciousness, and hemorrhage from the left ear, the left ear began to discharge copiously. The increase of the ear pain suggested the presence of a fracture of the base of the skull, and it seemed that thus the ear had become infected. The operation revealed an extra-dural focus of granulation-tissue and pus, and excluded the presence of a fracture of the base passing through the ear, because the bone in the surrounding parts could be examined well into the healthy tissue, and a branch of the middle-meningeal artery with its vein was seen to pass uninjured over the dura. The

fall of temperature with alleviation of pain seemed to show that we had exposed the only focus, as the pulse had never sunk below 80 and no symptoms of an abscess were present. The later exploration of the temporal lobe, even if it had struck the abscess and not passed 2cm away from it, would have been too late, as a perforation into the ventricle had already taken place. As no injury was present to the external coverings of the scalp, the rupture of the drum and the subsequent purulent otitis must be held responsible for the subsequent course.

Case 2.—Large abscess in the temporal lobe, containing gas, after chronic purulent otitis media. Operation. Recovery.

R. K., fourteen years of age, had suffered four years from a right-sided discharge of the ear which had never given him any pain and was never treated. On October 16, 1902, patient was taken ill with violent headache, vomiting, and fever. He was given a powder for the fever, and perspired very freely. After this the fever is said not to have returned. Four days later he felt he had recovered his health so that he was again able to return to school. The headache, however, immediately recurred. No vomiting, no fever, no convulsions, no paralysis, no pain in the ear. At the beginning some vertigo.

October 23, 1902, 3 o'clock.—The boy was well-nourished, but appeared to be very ill and complained of very severe frontal headache. There was no pain in the region of the ear. Throat and lungs normal, pulse 68, regular and uniform. The right canal was not stenosed and contained a little fetid pus. A large perforation was present; the hammer could not be seen. The mastoid process was externally unchanged and not tender. There was no pus on percussion. No paralysis of the ocular muscles. Slight horizontal nystagmus of both eyes. Vision normal. Eye-ground of left eye is normal; the disk of the right eye is yellowish-red, the margins blurred, the vessels not tortuous. The lids are somewhat œdematous. The urine contained no albumin. No vertigo, no staggering, even with closed eyes. Temperature 37.5°. In the evening the temperature was the same, but the pulse had dropped to 58, irregular, and accompanied by headache so severe as to make the boy cry out. Immediate operation, beginning with the usual radical operation. In the antrum there

was a small amount of granulation tissue but no especial caries of the walls. The anvil was removed; there was no hammer to be found. The sinus was exposed and found healthy. With the bone forceps the bony opening was enlarged so that the dura of the cerebellum and of the temporal lobe were exposed. A small vein emptying into the sinus was wounded and bled profusely. The dura in both regions appears entirely normal. It is translucent and thin. The temporal lobe was punctured with a syringe. The second puncture withdrew a frothy, grayish-brown, intensely fetid fluid. The incision which was then made evacuated half a glass of the same fluid intermingled with gas. The wound was packed with iodoform gauze. In the evening the pulse had risen to 76, it was no longer irregular. On the following day there was no headache, no vomiting. The general condition was good, pulse varying between 80 and 90.

October 28th.—The gauze packing was moist, but there was no pus. The large cavity in the brain diminished rapidly, so that only a small strip of gauze could be introduced. A fistulous path $3\frac{1}{2}$ to 4 cm long led into the depth, so that, on November 26th, I replaced the gauze by a drainage tube. This was gradually shortened and left off on December 3d. The patient got up for the first time on December 7th, and on December 21st the wound was entirely healed. The ear was firmly closed by a scar. Eyes normal, no nystagmus.

ON OTITIC PYÆMIA.

BY DR. RICHARD FREYTAG, MAGDEBURG.

(*Zeitschrift f. Ohrenheilk.*, Vol. XLV., p. 127.)

Translated by Dr. ARNOLD KNAPP.

Case I.—Acute otitis media after measles. Empyema of the mastoid process on both sides. Osteophlebitic pyæmia. Metastasis in the sterno-clavicular articulation.

L. Z., seven years of age, passed through an attack of measles in May, with pain in both ears and otorrhœa. He was referred to me on account of the continuous pain in the ear.

June 7th.—A well-developed child of lively disposition; presents a very apathetic appearance. There is no special complaint except pain in the right ear. The right mastoid process is distinctly tender.

Both drum membranes are red and swollen. Perforation down and in front, copious discharge. No appetite. Moderate bronchitis. T. 37.6° C., P. 86.

On the following morning there was a chill followed by perspiration. In the evening the temperature was normal. The chill was repeated.

On July 10th, temperature 40.2° , dropping to 37° in the evening. The right mastoid is more painful.

Another chill on July 12th. Temperature 41° . Urine slightly clouded.

Operation on that day. Soft parts normal. The cortex shows numerous bleeding points. The bone is soft and contains blood. The cells and the antrum are filled with pus and granulations. The sinus was displaced forwards and was exposed at the beginning of the operation. It appeared perfectly normal both to inspection and on palpation. The surrounding bone was also healthy. Bandage.

The temperature in the evening rose to 40.3° without a chill.

July 15th.—T. 37.8° – 39.6° . The child complains of pain on moving his right arm. A cause for this is found in a decided tenderness and swelling of the right sterno-clavicular joint. A bandage was applied and salicylate of soda ordered.

July 16th.—T. 37.5° . The tenderness of the joint has somewhat increased. On that afternoon the patient was again operated upon. The right sinus was further exposed without presenting any pathologic changes in its walls. The left mastoid process was opened and showed the same condition as in the right side. The antrum and the walls were filled with pus and granulations. The sinus was not exposed.

July 17th.—T. 37° .

July 18th.—T. 36.9° – 37° . After this the course was afebrile and convalescence was rapid.

The improvement in the general condition of the child after the second operation was very striking. While before the child was apathetic and sleepy, it later became so lively that it was difficult to keep it in bed.

Changes in the right sterno-clavicular joint disappeared in a few days.

I report this case because it shows in an excellent manner the clinical picture of the osteophlebitic pyæmia as described by Körner. The disease coming on after an attack of acute otitis during measles, the pyæmic fever, the metastases in the right sterno-clavicular joint, and the immediate cessation of the fever after operation on the left mastoid are characteristic. As aural suppuration and empyema of the mastoid process in small children are frequently associated with high fever, it might be stated that the case was not a pyæmic one. The repeated chills with temperature over 40° , the decline with profuse sweat, and the involvement of the sterno-clavicular joint, to my mind, belong only to severe pyæmia, and we must assume at first an involvement of the sinus. But exposure of the sinus and of its surrounding parts revealed no abnormality, and this is also confirmed by the subsequent course.

It is not my intention to stir up the old discussion about the existence of an osteophlebitic pyæmia, but, without wishing to belittle the services of Leutert in having ex-

plained the clinical and pathologic changes in otitic pyæmia, I must state it as my opinion that his theory, viz., that there is no pyæmia without sinus-thrombosis, cannot cover the many-sided clinical picture of otitic pyæmia. It is undoubtedly too schematic and should not attempt to explain all the clinical appearances of the various cases, though it has proved satisfactory and valuable in showing us the proper therapeutic measures. Continuous fever in the presence of an aural suppuration where there is free drainage from the tympanum indicates that the sinus should be exposed and opened. There surely can be no doubt about this point, though the absolute lack of danger of this step has not been accepted by all. Up to the present date there are three cases where exposure of the sinus has been followed by severe pyæmia. The first was observed in the Clinic at Halle (*A. f. O.*, xlix., p. 120). In a radical operation for cholesteatoma the normal sinus was exposed in the space of a bean. Normal course. The patient is discharged on the ninth day. One week later the temperature in the evening rose to 40.6° and the patient is re-admitted. Under continuous high temperature the elbow and knee joints became inflamed. On the sixth day death ensued. *Autopsy* showed that the sinus contained, in addition to blood coagula, a yellowish-brown parietal thrombus corresponding to that part of the sinus exposed at the operation. In the remarks, it is stated that a secondary infection during the after treatment cannot be excluded, though it is improbable, as such an occurrence had not been previously observed and the case was recorded and treated for one of articular rheumatism. The autopsy showed that it was an artificial sinus-thrombosis resulting from the operation.

Panse (*A. f. O.*, li., p. 23), after the publication of this case, related a similar case in which the sinus had also been exposed during a mastoid operation. Twelve days after the operation, chills. The sinus operation was performed a few days later and a purulent thrombosis was found. Death. According to Panse, the thrombus in this case was produced by the presence of a small collection of blood between the sulcus and the sinus. This became infected and the

perisinuous abscess led to destruction of the wall and to thrombosis.

The third case was observed in the Rostock Ear Clinic. During an operation after scarlet fever the sinus was inadvertently exposed. Twelve days later, the wall of the sinus was covered with granulations. After five days, the temperature rose to 40° without a chill. The granulations on the wall of the sinus did not show anything abnormal. On the following day the temperature was 40.1° . The jugular vein was ligated on account of suspected pulmonary metastasis. The sinus was exposed and incised and fluid blood evacuated. The clinical picture of pyæmia developed without chills but with high temperature and occasional pain in the various joints. After four weeks, normal temperature and recovery.

Körner explains this pyæmia from an irritation of the sinus by the introduction of gauze so that a parietal thrombus was caused, and he warns against exposing a normal sinus unnecessarily.

A fourth case can be added from my own Clinic.

CASE 2.—G. S., thirty-six years old, was operated upon July 16, 1902, on account of a chronic middle-ear suppuration with polypi and caries in the attic and antrum. During the operation the sinus was exposed. Normal course. At the second dressing, July 23d, the exposed sinus-wall showed beginning granulations. The patient was discharged for out-door treatment.

On the following day after a short walk he felt unwell, with headache, chills, and fever, which were repeated on the following day.

July 28th.—He was re-admitted to the Clinic. Temperature, 38.3° . He complains of very severe headache. Loss of appetite. On changing the dressing, there is found at the region of the exposed sinus-wall a small pulsating drop of pus. After cleansing, the sinus wall appears inflamed and red. Temperature, 39.6° .

July 29th.—Temperature, 36.3° – 39.8° . General condition poor. The headache is less. During dressing the perisinuous suppuration appears to have ceased.

July 30th.—T. 38° – 39.3° . No chills. Condition in general has improved.

August 3d.—T. 38° – 40.4° . A chill in the afternoon.

On the next two days there was some rise of temperature.

On August 10th, temperature 38° , and from this on an uninterrupted recovery. The patient remained in bed for about eight days and was discharged on the 21st. The patient subsequently again began to complain of pain in the occiput corresponding to the course of the sinus, which was unusually tender. He was again admitted, and on September 2d the sinus was exposed backwards expecting to find further pathologic changes. The sinus and the dura covering the cerebellum, however, were perfectly normal. No further fever. There have been no further disturbances.

In this case an inadvertent exposure of a very small portion of the sinus wall was followed by a pyæmia which fortunately did not lead to severe consequences.

Infection of the sinus in this case probably occurred through the packing on the sinus becoming infected, and thus a perisinuous abscess was formed, which led to a parietal thrombus. I think unquestionably a thrombus was present, on the evidence of the second attack of fever from which the patient suffered.

An extensive exposure and exploration of the sinus was surely indicated and would have been done but for the fact that the general condition of the man while in bed improved so rapidly that the chills did not recur and no metastases appeared. The subsequent exposure of the sinus did not give any clue for the cause of the severe pain in the occiput.

These cases in short show that we may have very unpleasant surprises from an innocent exposure of the sinus. It is worthy of note that in all cases the sinus was displaced and that the exposure was accidental. It is unquestionably proper that such cases should remain in bed at least fourteen days.

CASE 3.—G. M., four years old, suffered from scarlet fever in September. Complained of severe pain in the ear on the 8th of October, which was followed by otorrhœa and the pus was very soon fetid, a symptom which, according to the Ear Clinic in

Halle, is important prognostically as evidencing a severe course of an aural suppuration. Even before the otorrhœa, the left mastoid process had become swollen and fluctuated.

October 11th.—A feeble child in poor general condition in the period of desquamation. Urine contains no albumin. Both ears are filled with fetid pus. There is a large perforation in the drum on the left side. Periosteal abscess.

Operation.—After broad incision of the periosteal abscess and evacuation of the pus, the mastoid process is exposed and the cortex shows but little change. The bone is hard, the cells are filled with pus without marked pathological changes in the mucous membrane. It seemed as if a normal mastoid process had been filled with pus. The sinus was not exposed, as the condition in the mastoid process in connection with the remnants of scarlet fever explained sufficiently the clinical symptoms.

On the following days the general condition was satisfactory, but the fever persisted, and on the sixth day the right mastoid process was opened. The bone was found soft and hemorrhagic. The cells and antrum contained pus and granulations. During the dressing the peculiar dry condition of the left mastoid was noted. There was no evidence of any formation of granulations. The wound was of a dirty-white appearance—in other words, the bone was necrosing, and it became evident that another operation would be necessary. This, however, could not be undertaken on account of the poor condition of the child. Repeated evening rise of temperature. The child's condition did not get any better, and on October 27th the temperature rose to 40° , with a chill and collapse. On the following day it was decided to operate.

Oct. 28th.—A necrotic piece of bone was removed and the sinus was exposed. On opening the cranial cavity, a thick stream of fetid pus covered the field of operation, followed by profuse venous hemorrhage, which came from the ruptured sinus. The bleeding stopped on packing, and the sinus was freely exposed. Its wall and that of the surrounding dura were covered with unhealthy granulations and pus. The sinus wall was incised and soft thrombus masses were removed from its lumen, until another thick stream of blood appeared from the peripheral end.

Oct. 30th.—T. 38.5° – 45° .

Oct. 31st.—T. 37.8° – 40° .

Nov. 1st.—T. 37.1° – 38.4° . The wound was dressed and appeared very much cleaner. The peripheric part of the sinus was dry. There was some pus in the central part. Pressure on the soft parts of the neck forced thick pus out of the sinus. Some additional thrombus masses were removed with the curette.

Nov. 2d.—T. 37.5° – 40.5° .

Nov. 3d.—T. 39.5° – 37.7° . The jugular vein was ligated, though there were no pathological changes to be seen. At dressing, the central end of the sinus was found perfectly dry, and no more pus could be evacuated. In the evening, the temperature rose to 40.9° , and the child went into collapse. She recovered on the injection of camphor and doses of alcohol. The pulse was frequently not to be counted and generally very rapid, though uniform and of good force.

Nov. 8th.—T. 36.5° – 40.5° . At the dressing, the central part of the sinus opening was found closed. Considerable pus escaped from the peripheric opening. This was carefully irrigated and drained.

Nov. 10th.—The discharge of pus continued from the peripheric end. The bone in this region is removed, and the sinus is exposed up to the confluens. The dura everywhere is normal. The sinus is opened, and softened thrombus masses are removed, until free bleeding is established. The temperature slowly fell. The discharge from the sinus grew less.

On November 28th there was no suppuration from the sinus. The granulations in the wound were everywhere healthy, except at one part of the bone, which appeared necrotic. This was removed. The roof of the tympanum was also removed. The dura of the middle cranial fossa was found normal. The subsequent course was uneventful. The eyes were frequently examined, but always appeared healthy.

During the spells of fever, the general condition of the child was a deplorable one, with frequent attacks of collapse, which had to be treated energetically. In the period of normal temperature, the pulse was always very rapid (120–150), a probable evidence of toxæmia, but was never irregular. This action of the heart is probably responsible for the child's recovery. It seemed to me of considerable advantage to give enemata of salt solution, which were always followed by a great improvement in the general condition

of the patient and in increase in appetite. There was no diarrhœa.

Of special interest in the course of this disease, was the acute necrosis of the left mastoid, which became complete a few weeks after the beginning of the aural suppuration. This is always a sign that the constitution is very much weakened and that the resistance is lowered. It is nearly always only observed in the course of scarlet fever. There must, however, be some other reason why this necrosis takes place under these conditions, because there is no reason present why the left mastoid should become necrosed while the right presents the usual form found in empyema of the mastoid process. It may possibly be—leaving anatomical variations in the structure of the bone aside—due to a varying degree of virulence in the bacteria. The necrosis led to a perisinuous abscess, and this in turn to sinus thrombosis. The latter, with its unfortunate consequences, might have been prevented, if the bone had been removed down to the sinus at the first operation. This, however, did not seem to be called for.

At the time of the second operation, the thrombus of the sinus was not a complete one, as is shown by the rupture of the sinus and hemorrhage. These ruptures are not uncommon, and indicate an extensive disease or destruction of the sinus wall. The large perisinuous abscess had compressed the sinus. On the sudden evacuation of the pus, the diseased wall no longer withstood the pressure. A thrombus was already present. Complete removal of the thrombus mass was not possible, owing to the poor condition of the child. These thrombosed masses which remained probably caused the further suppurations in the sinus.

That the chills and the pyæmic fever should continue after the evacuation of the sinus and ligation of the jugular vein has been frequently observed, and has been interpreted in a variety of ways; that it is due to a previous dissemination of the infectious material into the body I cannot agree to, on account of the long period of fever and the absence of all metastatic inflammations. Occasional increase in respiration might be due to small metastases in the lungs, which

could not be detected. It is perfectly possible that the infectious material was transmitted by retrograde infection, viz., through the petrosal sinus and the vertebral vein. It is also possible that a thrombus existed in the jugular bulb.

I think it ought to be stated that the continued infection of the body might have been due to the bone remaining in the mastoid, which was filled with bacteria, and later began to necrose. The toxins absorbed by the blood produced the pyæmia in a similar manner as Ponfick and Brieger have shown in the case of nurslings, or an ordinary invasion of bacteria may have taken place. The pus in the blood was unfortunately not examined bacteriologically, as I had no hesitancy in regarding the streptococcus as the infectious agent. The course of the pyæmia, however, showed that the infection was not a very virulent one, and after the complete removal of the bone the attacks of fever and chills ceased.

REPORT OF THE THIRTEENTH MEETING OF
THE GERMAN OTOLOGICAL SOCIETY, MAY
20 AND 21, 1904, IN BERLIN.

BY DR. ARTHUR HARTMANN.

For the first time the Society met in Berlin. The meeting proved to be in every way a most successful one, as there were 57 papers announced, and 160 members present. The chief subject was the Anatomy of Deafmutism, introduced by Professor Siebenmann (Basel). This author treated congenital deafmutism only, of which he gave a very complete picture of our present knowledge, and reported a very interesting newly examined case, together with seven previously published.

In order to stimulate the investigation of the deaf-mute ear, a monograph on the Anatomy of Deafmutism is to be published by the Society, and the first part, which has just appeared, will be sent to all members.

The exhibition of specimens and apparatuses was unusually extensive and interesting.

The next meeting will be held in Homburg in the spring of next year. The subject for discussion will be the Deaf in the Schools, introduced by Drs. Hartmann and Passow.

The first paper was by

DR. SIEBENMANN: **Report on the anatomy of congenital deafmutism.**

In regions poor or rich in cretins there are about equal numbers of individuals with congenital, as with acquired, deafmutism. On careful examination of the autopsy material, the striking result is reached that in only about one-tenth of the 180 deaf-mutes whose ears have been examined, deafmutism depends upon congenital changes. The perusal of a continuous and uniform series of autopsies of deaf-mutes shows that acquired deaf-

mutism does not come more rarely to autopsy than the congenital form, though the first shows generally changes limited to the membranous labyrinth, which in earlier years, when microscopic technique was not sufficiently well developed, were usually overlooked. In most of the autopsy reports published by Mygind of congenital deafmutism, changes in the labyrinth are described, which are unquestionably due to meningitis or to an inflammatory middle-ear process.

In 17 positive cases of congenital deafmutism, in one case bilateral total absence of the bony and membranous labyrinth was found, combined with absence of the greater part of the petrous pyramid. In the remaining 16 cases, deafmutism depended upon degeneration and arrests in development of the sensory epithelium and associative nerves. At the present time the following classes may be described:

I. Degeneration affects only the epithelium of the lamina spiralis membranacea (2 cases).

II. Degeneration affects the endo-lymphatic epithelium to a large extent or extends into the inferior region of the labyrinth. Together with metaplasia of the epithelium, the diseased membranous labyrinth undergoes an enlargement (ectasia, collapse). The 14 cases of this group may again be subdivided as follows:

1. A complex of changes, which was first described by the author, not limited to the labyrinth, but extending to the anvil and the labyrinth windows. The *Mt* is normal; the degeneration in the labyrinth restricted to the cochlea. The cochlear nerve with its ganglion mass is very well preserved. The two individuals belonging to this group presented distinct hearing remnants.

2. Mundini, at the end of last century, reported a variety of labyrinthine changes in deaf-mutes where the same changes were found in seven individuals. The ectasia affected principally the apex of the membranous cochlea and the aqueductus vestibuli. The internal framework of the cochlea, which consists of connective tissue and bone, was absent in the other half of the cochlea. Alexander (Vienna) has given us the histological examination of such a case.

3. Another anatomical variety of labyrinthine change in deaf-mutes Scheibe has described in two cases. Two additional cases have been reported by the author together with Oppikofer, and another by Katz. In all these cases, the ectasia was combined

with more or less pronounced folding of the walls of the sacculus and ductus cochlearis. The cases of familiar disease which have been observed, and of deafmutism which have been examined, belong to the second and third of these groups.

Dr. HABERMANN (Graz) reported upon **clinical and pathological examinations of cretins**. He was able to examine microscopically the ears of two cretins. In one the ganglion cells of the cochlear nerve were displaced, though they had not all advanced into the ganglion canal, and an arrested development of Corti's organ was present. The author is inclined to regard the case as one consecutive to inherited cretinism produced by the absence of the function in the thyroid gland of the mother during the first months of gestation. In the two cases the internal ear was healthy, but there existed a purulent middle-ear inflammation with its sequelæ.

Dr. SIEBENMANN (Bâle) described the **microscopic changes** which he had found **in the ears of a congenital deaf-mute**. They presented a very interesting condition. Moreover a short time before death a functional examination not only in relation to the auditory but also in relation to the static sense was undertaken. The individual was one of a deaf-mute family, consisting of three deaf-mutes, of whom one had already furnished a very interesting anatomical examination and report at a previous otological meeting. Just as in the latter case, the changes were limited to the membranous cochlea and to the round saccule of the vestibule. They consisted principally in an extended degeneration of the epithelium with distension and folding of the walls and atrophy of the cochlear nerve. Though not a single normal Corti's organ and not a single normal auditory cell were found in the cochlea, the deaf-mute person in question possessed in that ear in which the middle convolution of the cochlea was very well innervated, a sufficiently accurate understanding for vowel sounds. Of the eleven octaves of the perceptible tone scale, five could be heard. The ear on the other side was deaf to almost all sounds and to the tones of the seven octaves, as well as for all the tones from *b* downwards. The round saccule of the vestibule was the only one of the vestibular structures degenerated. The static function proved to be quite normal both in the rotating expression as well as for the sensation of vertigo and the rotating nystagmus. The neuro-epithelium in the ampulla and in the utriculus in both hearing organs is thoroughly in accord with this finding.

The latter condition of the ear is a support and a proof for the correctness of that view which gives to the superior part of the labyrinth chiefly a static and not an auditory function.

Dr. ALEXANDER (Vienna) reported on the **microscopic examination of the ear of a deaf-mute**, thirty-five years of age. In addition to other changes, there were bilateral atrophy (hypoplasia) of the eighth nerve in the trunk and branches and of all of the ganglia, atrophy of the static nerve, of the terminals of Corti's organs, and bilateral arrest of development of the capsules of the cochlea.

Dr. SCHWABACH (Berlin) reported on the **anatomical findings in six labyrinths of three deaf-mutes**. In the two first cases from the history it must be assumed that the deafness was acquired in the first years of life, though from the result of the histological examination it seems that there probably must have been a congenital defect caused by an arrest of development in the membranous labyrinth, associated with an atrophy of the spiral ganglia and an atrophy of those nerve fibres which pass from these ganglia between the two lamellæ of the spiral osseous lamina, and in the rudimentary development of Corti's organs. It is not possible to state whether the defect of the latter structures was caused by an atrophy of the spiral ganglion or the opposite.

In the third case the deafmutism was unquestionably acquired. The case was of one who had survived an attack of cerebro-spinal meningitis in the seventh year, which had led to the complete obliteration of the cochlea, with newly-formed bone-tissue on both sides and a peculiar new formation in the vestibule, also bilateral. This consisted principally in a convolution of medullated nerve fibres, presenting the picture which Virchow has described as an amputation-neuroma.

Dr. KATZ (Berlin) demonstrated a **specimen** from a case of **congenital** and from two cases of **acquired deafmutism**, from a deaf albinotic cat and from a dancing mouse.

Discussion.—HAMMERSCHLAG distinguishes between true congenital deafmutism and that acquired during uterine life. LUCEA is rather sceptical in regard to the results of hearing examinations in deaf-mutes, inasmuch as the sense of touch cannot be excluded. It is possible to have a reaction to sounds which are not heard. SIEBENMANN observed in a cretinic idiot different changes from those described by Habermann. HABERMANN

states that he was the first to recommend decalcification of the temporal bone in 5 per cent. nitric acid and to report on observations made on the examination of deaf-mute ears. ALEXANDER imbeds the specimens first in celloidin and then decalcifies them in 8-10 per cent. acid. KATZ reported upon the condition of the brain found in a case of deafmutism.

Dr. ALEXANDER (Vienna) reported on additional studies **on the ears of animals with congenital anomalies in the labyrinth**, and demonstrated some specimens. From numerous examinations of the ears of a dancing mouse, dancing-mice embryos and, cats, he describes the following groups: 1. A sacculo-cochlear degeneration. 2. Congenital atrophy of the auditory nerve. 3. Congenital anæmia of the labyrinth. 4. Congenital filling up of the cochlea with blood-vessels. 5. Atypic development of the papilla basilaris and of the peripheric Corti's organs.

This author then continued to speak on congenital deformities of the internal ear with demonstration of specimens from the embryo of a cat 11 mm long in which synotia was present.

Drs. FREY and HAMMERSCHLAG (Vienna) reported on **rotating experiments in deaf-mutes**. They came to the following conclusions:

1. In a deaf-mute reacting positively to the rotating experiment the intensity of the nystagmus shows a distinct dependence upon the increase in movement.

2. The rotating nystagmus is not a suitable differential point between congenital and acquired deafmutism, though its presence in the congenitally deaf is more frequent than in those becoming deaf later in life.

3. The deaf-mutes without hearing are not affected by rotation. The best hearing deaf-mutes show generally rotating vertigo.

Dr. HAMMERSCHLAG reported on the **relation between hereditary degenerative deafness and consanguinity of the parents**.

He has been able to show that a multiple appearance of hereditary deafness is a very suitable means to demonstrate the relation.

Dr. FREY (Vienna) reported on **experiments** which he had made **on deaf-mutes** in order **to test the intensity of the knee-jerk**. In a large number of cases a decided diminution of this symptom was present. The connection between the

result of this experiment and the theory of a labyrinth tonus is described.

Professor DENKER (Erlangen) reported that in the Bavarian Senate the following motion was passed for the further instruction of deaf-mutes :

"The favorable results which have been obtained for a number of years in Munich by the separate instruction of those inmates of institutions who possess sufficient hearing remnants have seemed to make it advisable that similar opportunities for instruction for those becoming deaf late in life and those still possessing speaking remnants should be given. They are to be collected in separate classes and instructed by a method in which the eye and the ear are equally employed ; and it would seem desirable that in the various institutions for deaf-mute children separate divisions should be formed for those with auditory remnants."

Thus it seems that at least in Bavaria the method introduced by Bezold and his friends of separate instruction for those deaf-mutes retaining sufficient hearing and speaking remnants is assured.

Dr. MANN (Dresden) has previously reported on the **mechanism of the movement of the blood in the internal jugular vein.** His observations were on a case of exposed bulb of the internal jugular vein in chronic purulent otitis media. If the patient rotated his head on the vertical axis towards the healthy side so that the sterno-mastoid muscle of the diseased side was almost in a vertical position, the exposed bulb exhibited distinct pulsation, while in every other position of the head it was quiet. He concluded from this that the pulsation in the internal jugular was a compensatory arrangement, inasmuch as on the other side of the skull the venous outflow is retarded in this position. The pulsation in this vertical sternocleido position extends into the sinus, as he was able to observe in a case where the sinus was exposed in a perisinuous abscess. By this means the presence of an obturating thrombus in an internal jugular vein can be demonstrated, and this explains the repeatedly observed air-embolism in injury to the sinus. Two patients were demonstrated to show this feature.

Dr. WINKLER (Bremen): on **operations on the mastoid process and opening of the antrum with consecutive meatoplasty**, with demonstration of patient.

In all simple mastoid cases the author removes the tip of the mastoid and the posterior bony wall, as the preservation of these parts is not essential to the future function of the ear. It is, however, important always to leave a bridge of the posterior bony canal wall in the neighborhood of the *Mt.* Aside from the fact that by this extension of the operation complete elimination of the mastoid cells is possible, the depressions and recesses beneath the auricle are avoided, which are so frequently present if the posterior auditory canal wall and the tip of the mastoid process be preserved. If the mastoid process is unusually broad, where the old method would often leave a very large defect in the bone which could later only be corrected by a larger plastic procedure, as well as in stenosis of the auditory canal or congenital stenosis or periostitis, a meatoplasty is made immediately after the operation on the bone. This consists in the incision and retraction of the membranous canal downwards, while the detached auricle is sutured to the posterior cutaneous wound. In this distended canal the discharge from the tympanum and antrum is collected by gauze slips. By this means the cavity remaining after a very extensive operation is very much reduced and heals in a similar manner to that after the plastic step in the radical operation. A case was presented which was reported on in 1901, in which though a very large bony cavity was present the depression behind the auricle is absent. If the mastoid operation in this case had been performed according to the old method, by preservation of the posterior bony wall, the large defect in the bone could only have been brought to cicatrization by the formation of cutaneous flaps. Winkler's method is therefore simpler and gives better cosmetic results.

Dr. WINKLER (Bremen) reported on the **osteoplastic exposure of the frontal sinus**, with demonstration of a patient.

This was a case which had been operated upon in the spring of 1902, on account of a severe suppuration in the left frontal sinus. The frontal sinus was exposed by the following method and healed. The method consists in a cutaneous incision made at the inner angle of the eye. From this the cutaneous flap is detached towards the eye. Then a flap consisting of the soft parts and bone, including the external wall of the nose and the anterior wall of the frontal sinus is formed and detached towards the middle line of the nose. The cutaneous and the bone incisions must not correspond with each other. This has the

advantage that after thorough eradication of the diseased accessory sinuses and after the reposition of the bony and cutaneous flaps, the bone flap is held in place. The cases in which this method is suitable present, in addition to a very small cutaneous scar, practically no deformity. As has previously been stated, the author is of opinion that there is no universal operation for the surgical exposure of the frontal sinuses. It is difficult to adopt the correct operative plan in each case. This is determined: (1) by the diseased process, (2) by the varying shape of the nasal skeleton as well as of the frontal and ethmoidal cavities, (3) by the fact that the operation is performed on the face and later cosmetic results must be kept in mind.

The study with Röntgen plates of the sinus to be operated upon is of great value. The author refers to his publication in the *Journal* on the "Röntgenstrahlen," vols. v. and vi. Since 1899 the author has performed this operation six times in twenty-five operations on the frontal sinus. Essential for this operation is a healthy and unaffected bony wall, the soft parts must not be inflamed, there must be no cerebral or ocular symptoms. The X-ray picture must show: 1. Those landmarks necessary for the osteoplastic operation, consisting in: (a) thin anterior plate of bone in the frontal bone, (b) deep and high frontal sinus, (c) relatively moderate development of the orbital ethmoid cells. 2. The special points in his method, consisting in: (a) a thick condition of the frontal process of the superior maxilla, (b) a thick floor of the frontal sinus. In the two latter cases the operation proposed by Barth in Danzig should not be recommended. Finally the indications are given for performing Riedel's radical operation with the removal of the orbital bridge, and the improvement on this operation instituted by Killian with preservation of the orbital bridge.

Discussion.—JANSEN (Berlin) thought that in the method advocated by the speaker adhesions, cicatricial bands, and the formation of membranes easily developed in the region of the aditus which retarded healing. In regard to the operation on the frontal sinus, he had also obtained very good results in very large cavities by operating according to Killian's method with a flap composed of skin and periosteum from the anterior wall. If the mucous membrane is very much swollen and polypi are present, recovery is more rapid than when the mucous membrane is but slightly thickened and there is but slight discharge. According

to BRIEGER (Breslau), the osteoplastic operation in the frontal sinus is only for the purpose of more quickly and better obliterating the cavity. After the operation no lumen remains. GERBER (Königsberg) thinks that in cases with changes in the bony walls, with fistula and so forth, it is better to operate according to the old method. HOFFMANN (Dresden) makes use of the bone flap with the adherent skin and periosteum only when the walls are unusually thick. HEINE (Berlin) thinks that it is not proper to remove the posterior auditory wall if it is healthy. VON EICKEN states that the depression following Killian's method is not of any importance. It can at any time be corrected by the injection of paraffin. RITTER (Berlin) thinks a very broad bridge of bone is of great importance.

Dr. HINSBERG (Breslau) presented a patient on whom the Luc operation had been performed on account of a suppuration of the maxillary antrum. After recovery, on masticating, a clear fluid, saliva, poured out of the nose. There was evidently a **fistula of an abnormal Steno's duct**. On making an incision directly through the cheek the duct was exposed and divided directly in front of its opening. A part of it was made movable and transposed about 2cm farther down and brought through a new opening made in the mucous membrane. Recovery.

Dr. DENKER (Erlangen) reported on his investigations on the **Eustachian tube of the ant-eater**. The most important results of these examinations, which have shown that a Eustachian tube exists in this *Myrmecophaga didactyla*, are as follows:

1. The tube of this *Myrmecophaga didactyla* is not drawn out into a sheath-like tube, but represents a broad cavity surrounded by membranous walls.

2. In place of a bony tube, there is a round opening at the posterior and inferior corner of the tympanum to which the membranous tube is attached.

3. This opening in the *Myrmecophaga jubata* is surrounded anteriorly by the tympanum and partly by the pterygoid, posteriorly by a process of the basilar occipital.

4. The epithelium of the tube of the *Myrmecophaga didactyla* is a cylindrical epithelium possessing cilia which become somewhat flattened as it approaches the tympanic opening.

5. The layer of fibrous connective-tissue situated beneath the epithelium is surrounded by a thick layer of acinous glands which partly empty into the tubal lumen.

6. At a greater distance, the Eustachian tube is surrounded by three strongly developed muscles, of which one is situated in the frontal plane, surrounding the tube on the posterior and on the lateral sides. The other two are situated on the ventral side and extend occipito-orally.

Dr. ZIMMERMANN (Dresden) reported on **investigations on sound transmission in the ear.**

This was discussed by Drs. Kayser, Panse, Dennert, Vohsen, Frey, Lucae.

Dr. OSTMANN (Marburg) reported (1) on the sensitive curve of the normal ear as a measure for the sensitiveness of the deaf ear on the basis of an objective-hearing measure; (2) on the extension of his table of hearing tests in the deaf ear on the basis of the objective-hearing measure; and he demonstrated (3) a new C-fork series as a universally applicable objective-hearing measure.

Discussion.—PANSE believes that frequently cerumen produces an involvement of the labyrinth on account of the presence of high-pitched tinnitus. BLOCH states that the duration of vibration of tuning-forks varies after use. DENKER has had the same experience. VOHSEN finds that the sound which is made by the tuning-fork stretcher is very annoying. LUCAE objects to the term objective-hearing measure, as the examination depends considerably on subjective conditions. OSTMANN emphasizes the fact that tuning-forks must be firmly mounted. If the ear of the examiner no longer possesses the normal-hearing duration, the difference must be determined and taken into account.

Dr. QUIX (Utrecht) spoke on the **determination of hearing with the aid of tuning-forks.** He has had forks constructed on which are engraved the values for the commencing amplitude, the decrement, and the normal-hearing duration. In the examination the number of seconds must be determined for which the patient hears the sound, then the hearing acuity can be determined from the tuning-fork.

Dr. GÖRKE (Breslau). The pathological significance of **middle-ear exudates found at autopsies.**

In a systematic number of autopsies the author found in many adults collections of purulent exudate in the middle ear with an intact drum. These have not the significance of an associated appearance of specific diseases, as they are also present in cases which have nothing to do with otitis media. They are, moreover,

much more probably the result of the activity of the usual pyogenic organisms which become in the last years of life virulent, when the powers of resistance of the organisms diminish and the normal protecting mechanism is interfered with. In these cases of otitis with normal drums, there may be a necrotic process in the mucous membrane, the bone may become partially absorbed, the labyrinth involved, an extension of the suppuration to the medulla may take place or to the jugular bulb, and so forth. At the same time attempts at organization may occur in the exudates.

Discussion.—PIFFL (Prag) believes that in these cases the exudate is absorbed of itself, so that it is not necessary to do anything. KOBRACK found in three cases of otitis media produced by the pneumococcus the presence of agglutinating powers.

Dr. FRIEDRICH (Kiel). **Can broad operative opening of the spinal canal be of therapeutic value in certain cases of purulent cerebro-spinal meningitis?**

Discussion.—BRIEGER believes from his experience that any expectation that we may have of doing good by operating in purulent meningitis should be given up. KRETSCHMANN is of the same view. It is impossible to remove the exudate, and it seems very much more reasonable to expect something from serum-therapy to paralyze the toxic substances. PANSE states that notwithstanding sure proof of the presence of purulent meningitis, recovery can take place, so that our therapeutic endeavors are indicated.

Dr. STENGER (Königsberg) reported on investigations on the **development of otitic sinus thrombosis.**

Dr. BLOCH (Freiburg) on **dysthyric deafness.**

Just as there is a form of deafmutism which is a form of dysthyreosis, a similar but less pronounced expression of the influence of this dyscrasia on the hearing organ may produce dysthyric deafness. In clear cases this is a nervous deafness with all its attributes, and in the severe forms is associated with disturbances of speech. The most frequent clinical signs of dysthyreosis are struma, struma in the family, infantilism, adiposity, enlargement of the pharyngeal tonsil, defects of intelligence, nervous defects in the family.

The corresponding treatment of the disturbances of hearing brings only rarely rapid results. As a rule the treatment must be prolonged for years.

Dr. KOBRACK (Breslau) on **infections after removal of the pharyngeal tonsil.**

In over 100 operations, 38 slight general disturbances were observed; 2 presented unusually severe septic infection, with 1 fatal case.

Prophylactically it is necessary to watch for the manifest and latent sources of infection (scarlet-fever, diphtheria, etc.). Strict asepsis is, of course, necessary.

Discussion.—THOST (Hamburg) drew attention to the swelling of the cervical glands in the presence of pharyngeal tonsils. If the infection is a recent one, the glands are swollen, tense, round, and sensitive. In such cases the operation should be postponed.

Dr. SCHÖNEMANN (Bern) demonstrated a model of the human ear for use with a projection apparatus.

Dr. SCHEIBE (Munich) spoke on the pathogenesis of the empyema following acute otitis media.

Specimens were presented by Drs. KATZ (Berlin), ALEXANDER (Vienna), MANASSE (Strassburg). The last author demonstrated three cases of primary endothelioma of the middle ear and of the petrous pyramid.

Dr. JENS (Hanover) demonstrated an **unusually enlarged and bony middle terminal** which was removed at operation. It measured $4\frac{1}{2}$ cm high, $7\frac{1}{2}$ cm long, and weighed 80g.

Dr. KRETSCHMANN (Magdeburg) demonstrated a number of instruments: A palatal hook which differed from the usual models in that the straight handle which carries the hook which is supposed to grasp the uvula and soft palate is replaced by a handle which fits into the cavity of the hard palate, whereby less room is occupied in the mouth.

A tone depressor for autoscopy, where the mouth part describes a curve like a bayonet.

A tonsillotome with small forceps which grasp the tonsil and place it on the level of the tonsillotome.

Dr. KOBEL (Stuttgart) reported upon an **otitic brain abscess of the temporal lobe healed by operation.**

The question whether a brain abscess should be operated upon in a terminal stage is still open.

A child, eight years of age, of a tuberculous family, had suffered for a year and a half from a left-sided purulent otitis which apparently followed mumps.

On January 9, 1904, unconsciousness, with convulsions in the

right half of the face, arms, and legs, suddenly set in. At operation an extradural abscess was found in the floor of the middle cranial fossa, which was followed by improvement in the patient's condition. Eight days later again complete unconsciousness, which was preceded by a headache for two days.

At operation an abscess was evacuated from the left temporal lobe without any anæsthetic, as the child was in deep coma. Recovery after two months.

The case is of interest from three directions :

1. Because operation was performed on a patient where coma had existed for twelve hours, apparently in the terminal stage of a brain abscess.

2. On account of the depth and size of the abscess. The abscess must have extended well towards the lateral wall of the left lateral ventricle. The probe passed directly up in front for 9cm in the abscess cavity; a rupture into the ventricle was, therefore, imminent.

3. On account of the complete recovery without any disturbance of function.

The case shows that the operation for otitic brain abscess can be successfully carried out even after the onset of the terminal stage.

Dr. ALT (Vienna) spoke on the **relation between suppuration of the middle ear and epidemic and tuberculous meningitis**. Purulent inflammations in the labyrinth are not uncommon in tuberculous and in cerebro-spinal meningitis where the process may extend to the middle ear. In both cases the infection may take place from the naso-pharynx. The author presented some specimens of this kind.

Discussion.—VON EICKEN (Freiburg) has published two cases, and has arrived at the same conclusion.

Dr. WANNER (Munich): **Investigations on schools for feeble-minded children in Munich.**

Of thirty-nine children (twenty-two boys and seventeen girls), twenty-seven, or 69.1 %, were more or less deaf. These children belonged to five schools and represented about 0.5 % of the number of pupils who were debarred from instruction on account of feeble-mindedness.

Fourteen children (that is, 35.9 % of those found in the class of feeble-minded, or 51.8 % of those found deaf in these schools) were so deaf that they belonged to a deaf-mute institute, or at

least should be instructed according to the instruction for deaf-mutes.

A comparison of the graphic reports of the hearing of deaf-mutes in the hearing classes and those who are supposed to be weak-minded shows that 50-60 %—that is, half—of the normal hearing value for speech must be necessary for the children to follow the ordinary instruction in the public schools.

The speech of these children was correspondingly affected to the degree of deafness. Two very deaf children did not speak at all. Four were unable to speak at the time of entrance. Thirty-three and three tenths per cent. of all the children spoke correctly.

In addition to these 69.1 % deaf, there were 10.2 % children who were unable on account of defective hearing to follow the instruction in the ordinary classes, so that really the weak-minded were 20.7 %.

It is therefore very important that the schools for the weak-minded should be divided into schools for those who are deaf and those who are really feeble-minded.

Instruction in the classes for the deaf must be given by teachers who are conversant with the methods of instruction for deaf-mutes.

Dr. RUDOLF PANSE (Dresden) recommended a number of **simple experiments** which are of considerable importance.

1. To show that the ossicular chain cannot transmit any sounds, it is always stated that the articulations interfere with the vibrations, or that they dampen the sound too much. If both ears are closed with wax or moist cotton in a quiet room, a tuning-fork having been struck, say small *c*, and taken in the hand, the sound will be distinctly heard in each contraction of the muscles of the arm and of the hand, notwithstanding that numerous articulations intervene between the hand and the labyrinth, many more than between the drum and the labyrinth.

2. The hidden position of the round window is advanced to show the impossibility of transmission of sound. If the entire inner ear is removed in a temporal bone so that the windows are exposed internally and the drum and membrane of the round window is perforated, it is perfectly easy to hear with an auscultation tube fitted with a thin glass tube which fits into the round window. The interference and weakening of the sound waves by reflection are therefore very slight.

Dr. VON EICKEN (Freiburg) on local anæsthesia of the external auditory canal.

On injecting a 0.5 % solution of cocain with a proportional amount of adrenalin, it is possible to anæsthetize the various nerve trunks in the auditory canal and to render it absolutely anæsthetic for operations. The nerves in question are the auricular branch of the vagus and the auditory-canal branches of the auriculo-temporal nerve which enter at the junction between the cartilaginous and the bony canal.

Both nerves can be attained by one point of injection at the posterior attachment of the auricle at about the upper level of the bony canal wall. The auricular branch of the vagus is attained on directing the needle towards the tympano-mastoidal fissure in a direction backwards and upwards. The auditory canal branches of the auriculo-temporal nerve are reached by passing the needle internally and somewhat anteriorly, with the patient's mouth wide open, to about $1\frac{1}{2}$ cm deep.

The skin is previously anæsthetized by chloride-of-ethyl spray. Pain is thereby avoided, especially if on advancing the needle some of the solution is injected into the surrounding tissues.

The anæsthesia becomes complete after a number of minutes so that even furuncles may be opened without pain.

Accidents can be excluded especially as the facial nerve is entirely outside of the region operated upon.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

MEETING OF OCTOBER 13, 1904. DR. HERMAN KNAPP, THE PRESIDENT, IN THE CHAIR.

Presentation of Patients.

Dr. W. H. HASKINS presented a patient upon whom he had operated for **chronic purulent otitis with retention symptoms**. The patient, a woman twenty-three years of age, almost absolutely deaf, with otorrhœa for nine years, had suffered from pain for the last eighteen months. The pain in the ear recently has become worse, and there is facial paralysis. She was admitted to the hospital on September 10, 1904, with a temperature of 102°, pulse rapid and feeble. The auditory canal was obstructed by a polyp. Functional examination revealed practically no hearing. At *operation*, September 13th, the cortex of the mastoid was sclerosed, and the antrum contained pus, which was under considerable pressure. There was a defect in the tegmen tympani and the inner end of the floor of the bony canal was necrotic, so that after removal of this loose piece of bone the facial canal was found exposed. The disease had also extended to the tip of the mastoid and had laid bare the sinus. The tip of the mastoid contained pus. A meato-plasty was done and the posterior wound was left open. One week later, under ether skin grafts were inserted and the posterior wound closed. The subsequent course of the case was uneventful. The wound in the interior is not quite healed; the facial paralysis persists. In the left ear there is a perforation in Shrapnell's membrane. This case is interesting on account of the possible connection with a tuberculous focus in the lungs, the right apex being dull.

Discussion.—Dr. McKERNON thought this case illustrated the danger of allowing any chronic otorrhœa to go without operation after dead bone had been diagnosticated.

Dr. HARRIS thought that the tuberculous feature in this case was one of great interest. In the tuberculous cases the necrosis is apparently external to the labyrinthine wall. The cases which he had observed had been characterized by excruciating pain and otorrhœa.

Dr. PHILLIPS thought that in every case where tuberculosis was suspected very careful search should be made for definite proof. He had found this proof to be extremely difficult to obtain from examination of the discharge.

Presentation of Specimens.

Dr. HASKINS presented **two foreign bodies** which had been **in the ears** of an old man of eighty years of age for six months without causing any symptoms. They proved to be the artificial ear-drums made of rubber which are so extensively advertised.

Dr. ALDERTON demonstrated a **temporal bone** showing an **anomaly of the jugular fossa**. The jugular bulb extended unusually far up and considerably to the inner side of its normal position, so that it rose to a level above the floor of the tympanum and was only separated from the posterior cerebral fossa by a thin plate of bone directly external to the internal auditory meatus.

The paper of the evening was **some points respecting the surgical anatomy of the facial nerve**, by HENRY A. ALDERTON, M.D., of Brooklyn, published in full, see page 471 of this issue.

Discussion.—Dr. PHILLIPS thanked the author for his extremely interesting paper, and stated that there was very little for him to add except the general rules which he had found of service for avoiding injury to the facial nerve in operating. He thought (1) that with the proper direction the operator could proceed with chiselling up to 15mm, and (2) the important landmark for him was the floor of the aditus—everything above the level of this structure could be removed with impunity. He also recommended the use of the Stacke protector for operators of limited experience.

Dr. BERENS presented a very remarkable temporal bone show-

ing an unusually oblique course of the facial nerve in its descending portion. The specimen was demonstrated at the last meeting of the American Otological Society, and a photograph of this interesting anomaly will be found in the Transactions. He took exception with Dr. Phillips and thought that our important landmark in avoiding the facial nerve was the external semicircular canal. He also did not think it right that the fact that there is but one normal course for the facial nerve should be impressed upon students, as, he said, unquestionably abnormalities occur, and it is very much better to err on the side of over-caution.

Dr. ARNOLD KNAPP demonstrated two temporal bones, one showing the usual vertical course of the descending portion of the facial nerve, while the other presented the so-called oblique course. In regard to what Dr. Alderton had said about avoiding the facial nerve in the radical operation, he thought that the Stacke protector had been practically abandoned by all operators. The field of operation is small enough. He thought that the dangerous part of the facial nerve was not the part at the level of the floor of the aditus, but the part below this, and that it was very important, especially in cases where there was disease in the posterior area of the tympanic cavity—the so-called sinus tympani (Steinbrügge),—that every bit of overhanging bone which represents the innermost margin of the posterior auditory-canal wall should be removed, and it is of course in this part of the operation that the facial nerve is approached the nearest.

Dr. MCKERNON thought that unquestionably anomalies in the course of the facial nerve occurred, and he did not favor the use of the Stacke protector. He also considered the danger of injury to the facial nerve to be greatest at the level of the floor of the aditus.

Dr. DENCH said there could be no question but that the external semicircular canal is our most important landmark. He is, however, of the opinion that the nerve is most frequently injured in its horizontal course, viz., along the inner wall of the tympanum, where the dehiscences most frequently occur.

Dr. Dench also spoke of the facial paralysis which came on subsequent to operation. He had observed it a number of times, especially after the grafting operation, when he thought that too tight packing within the tympanum was responsible. In the other cases, the cause of paralysis must be found in injury to

the chorda-tympani nerve, resulting in a hemorrhage within the facial canal,—or in some cases an infectious neuritis may be present. He thought that caution with regard to injury to the facial nerve might be overdone and not sufficient bone removed to eradicate all disease. He was also of the opinion that a most important step was the trimming down of the remnant of the posterior bony-canal wall.

Dr. MEIERHOF wished to state in defence of the Stacke protector that this instrument was originally devised by Stacke for his intratympanic method of operating, and that later, when the operation was further developed by Zaufal and others, the use of the protector was no longer needed.

Dr. BRANDEGEE spoke of a radical operation which he had recently performed for cholesteatoma, during which twitching occurred upon curetting, but no paralysis followed. A second operation four days later was done for the purpose of inserting skin grafts. Twitching was again noted. Facial paralysis came on forty-eight hours after this second operation.

Dr. LEDERMANN thought that it was very important that a patient, before the radical operation, should be informed of the possibility of subsequent facial paralysis, which of course in most cases was only temporary.

Dr. KERRISON had been very much interested in the paper of the evening, especially in regard to the measurements which were quoted. He had himself made a large number of measurements, and had found that the distance between the mastoid cortex, just posterior to the suprameatal spine and the aditus, rarely exceeded 12mm and was often very much less. He therefore thought that Dr. Phillips's statement that 15mm was a safe distance was not quite correct.

Dr. HERMAN KNAPP thought that in the experience of every operator facial paralysis had occurred, and, if the matter should come into court, he would express his opinion that the mishap was due to a technical fault, unfortunate, of course, but one that exceptionally might happen to any one.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1903.

By DR. ARTHUR HARTMANN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY.

389. **Eschweiler.** On the development of the sound-conducting apparatus, with a special regard to the tensor-tympani muscle with four plates and six figures in the text. *Arch. f. Mikr. Anat. u. Entwicklungsgesch.*, vol. lxiii., pp. 150-196.

390. **Baum and Kirsten.** Comparative anatomical investigations on the aural muscles of various vertebrates. *Anatom. Anzeiger*, vol. xxiv., 1903.

391. **Weigner.** Experimental investigation on the question of the central course of the cochlear nerve in the *Spermophilus citillus*. *Arch. f. Mikr. Anat. u. Entwicklungsgesch.*, vol. lxii., pp. 251-262.

392. **Le Double.** Two points on the pathological anatomy of the bony auditory canal. *La presse oto-laryngologique Belge*, 1903, vol. ii.

389. **ESCHWEILER.**—The author has endeavored to study the development of the tensor-tympani muscle from its first position up to the stage where it attains the differentiated shape. The material was furnished by the embryos of seven pigs from 10.5 to 53 mm long. The result was that in the primitive condition an intimate relationship exists between the tensor-tympani muscle and the muscles of mastication, and that of the separation, and this connection takes place at a time when no muscular elements are present in the tympanic tensor. As soon as the blastemic position of the tensor is finally fixed, the muscular elements develop. The course of the development is such that the parts of the first branchial arches, situated orally, first develop into a definite form, while the area of the blastema which is situated aborally still remains in its primitive condition.

This is especially well seen in Meckel's cartilage. Even when the masticating muscles are well differentiated, the tensor-tympani muscle is still in its primitive condition, and then spreads from the muscles of mastication. As soon as it has reached its position, the formation of the muscular elements takes place in an inverted direction, namely, aborally to orally. The attachment of the muscles to the labyrinthine capsule takes place secondarily; in the embryo of 53 mm , the attachment of the muscular fibres to the labyrinth is to be seen. In the later or more developed periods, the connecting membrane which binds the muscle of the hammer and the masticating muscles is visible, namely, the tensor of the soft palate and its connective-tissue prolongation into the tympanum up to the belly of the tensor muscle.

Serial sections, moreover, show that the course of the chorda tympani as we are accustomed to see it in the grown-up animal appears secondarily. In the youngest embryos the chorda runs directly from the nerve of the second branchial arch to the tongue. It is prolonged aborally through the development of the blastemic pillar of the first branchial arch in the above described manner. Thus it leaves the facial nerve later at an acute angle, and its course approaches Meckel's cartilage and the lingual nerve.

AUTHOR'S ABSTRACT.

390. The muscles of the following animals were examined—horse, donkey, ox, sheep, goat, pig, dog, cat, and rabbit, and it was found that in each case a group of muscles corresponds to the solitary muscle in man. It is evident that in the higher development of the animal kingdom a reduction or simple amalgamation of the aural muscles occurs, which is so advanced in man as to almost reach the point where motility is entirely absent. A number of good illustrations are added. ESCHWEILER.

391. As this exhaustive paper is prepared in Bohemian and is consequently lost for science, the author has given a short résumé in the German tongue. In the zisel, the cochlea which projects freely into the tympanic bulla was destroyed partly mechanically and partly by the action of nitric acid, and then the degeneration of the nerve was studied according to Marchi or Busch. The following are the most important of the conclusions: The cochlear nerve spreads out in the ventral nucleus and in the auditory tubercle, which may be regarded as the ending of its first stage; from these gray masses the dorsal and ventral tracts originate;

the striæ acusticæ belong to the dorsal tract, differing from the striæ medullares of man; the ventral tract is much larger, especially the trapezoid body. The degeneration extended beyond the primary neuron, which the author explains from trophic disturbances.

ESCHWEILER.

392. I. The external opening of the bony part of the external auditory canal in the Yuwzäne skulls is either elliptic with a horizontal axis (75.1 %) or round (13.6 %), or elliptic with vertical or oblique axis (1.8 %). This third—the rarest—form in the Yuwzäne appears unequally more frequent in the American races and most frequent in the races where the skulls were formerly artificially deformed, or where this is still now being done.

II. In 8.5 % of American skulls (artificially deformed and normal), exostoses were present in the external auditory canal. The next in frequency in exostoses are the Australians, the South Sea Islanders, then the Egyptians, the African negroes, the Asiatics, and finally the Yuwzänes, with 1.03 %. The causes of the exostoses, just as the form of the external opening of the bony part of the external auditory canal, remain obscure.

BRANDT.

PHYSIOLOGY.

393. **Schaefer and Guttman.** On the differential perception for simultaneous tones. *Zeitschr. f. Psychol. u. Physiol. der Sinnesorgane*, vol. xxxiii., p. 87.

394. **Frey.** Further investigations on sound conduction in the skull. *Zeitschr. f. Psychol. u. Physiol. der Sinnesorgane*, vol. xxxiii., p. 355.

395. **Exner and Pollak.** On the resonance theory of sound perception. *Zeitschr. f. Psychol. u. Physiol. der Sinnesorgane*, vol. xxxii., p. 305.

396. **Fetzer.** On the resistance of sounds, especially vocal sounds, against harmful influences. *Pflüger's Arch.*, vol. c., p. 298.

397. **Emanuel.** On the action of the labyrinth and of the thalamus opticus on the attraction curve of the frog. *Pflüger's Arch.*, vol. xcix., p. 363.

398. **Exner.** On the clang-tint of the voice. *Centralblatt f. Physiol.*, 1903, p. 488.

399. **Moeller.** Remarks on the paper of Professor A. Barth on deceptions of hearing from pitch and clang-tint. *A. f. O.*, vol. lviii., p. 211.

393. Though the question of qualitative differentiation of individual successive sounds has been frequently and carefully studied, the differential perception for simultaneous sounds has not received so much attention.

The authors have first experimented with Edelman's forks.

They found that for g^1 , d^2 , and g^2 about 12-15 vibrations is the minimum of the difference in pitch in which the distinction can be made. The rapid irregular dying out of the sounds and the difficulty of always striking the forks equally hard proved to be very disturbing. In the sound measure of Appun (vibrating metal branches), the overtones were disturbing. The experiments were more successful with the sound variator of Stern. The four tables which accompany the paper, giving the observations of four musical observers practised in psychophysic observation, showed that the absolute differential perception for simultaneous sounds is decidedly less than for successive ones. In the middle part of the musical scale, the limits were found to be in a difference of pitch of from 10-20 vibrations. In the once-marked octave, the differential perception appeared to be the greatest.

Lower down there was a distinct increase of the threshold. The observations, however, for the deep tones are unreliable, on account of their weakness. Of the once-marked octave up to d^3 , the perception does not show a decided tendency to decrease. Farther up this tendency comes on more rapidly.

In the opinion of the reviewer, it would be extremely important to remember these interesting observations belonging to physiology of the hearing in the examination of cases of *dipacusis dysharmonica*.

DREYFUSS.

394. The present paper is, in a certain sense, a correction of one previously published in the above-mentioned journal and reviewed in this magazine.

At that time FREY believed that the phenomenon that the sounds of a tuning-fork screwed into the auditory canal of a macerated skull were heard more intensely in the petrous pyramid of the opposite side was due to the fact that the pyramids represented the most compact bony structures in the skull.

In the present experiments, the tuning-fork was attached to the occiput, somewhat below the lambda fontanelle in the median line, and it was found that the highest intensity, even higher than at any other place,—in fact, higher than in the immediate neighborhood of the source of the sound,—was situated at that point, about 2.5cm above the glabella, so that the point from which the sound originated was diametrically opposite.

It is therefore a peculiarity of the skull that sound originating in the pyramid, or in the occiput, causes the diametrically

opposite part of the skull to vibrate most intensely. The intervening points are less affected. In general the sound is less marked in the plane at right angles to the course of the sound. The results were the same even when the microphone was placed vertically to the surface of the skull and parallel to the surface in a trephined skull.

395. The experiments endeavored to test whether the mechanical processes taking place in the hearing of sound possess the characteristics which are peculiar to the physical appearances of covibration. The order of experimentation which was made cannot be described without giving the illustrations, and must be looked up and studied in the original. The results are in accordance with Helmholtz's covibratory theory.

1. The transposition recurring periodically in a tone-wave of half a wave length produces a sensation which cannot be differentiated from that produced by vibrations.

2. A sound-wave in which these transpositions occur with sufficient frequency produces a sensation of tone of less intensity than that sound-wave does, if it is free from all phase-transpositions.

3. The auditory impression produced by a sound-wave with these phase-transpositions grows less in its intensity, not only when the elongations of its vibrations become smaller, but also when the number of vibrations increases in the time unit.

4. This diminution of intensity can go on to the obliteration of the sound.

DREYFUSS.

396. This paper, of extreme interest to the aurist, is a continuation of the well-known experiments of Oscar Wolf on the differences in sound intensity of the various vocal tones. It is a well-known fact, which we observe every day, that on the approach of a band we can hear the deep instruments at quite a distance, while we are not at all struck by the intensity of those sounds in our proximity. On the contrary, our ear is attracted most by the high-pitched instruments.

The experiments of the author consisted in:

A. *Diminution of the vocal sounds by the atmosphere.* It was first determined at what distance the sound of certain sung vowels could still be heard, and in which way the character of the vowel was altered by air. It was seen that of equally and loudly sung vowels A had the greatest resistance; then came o, E, I, and finally u. Even in distances in which the subjective

pitch of the sung vowels was not nearly reduced to the threshold value, when the sound could still be heard, the vowel character was distinctly interfered with, either by the resonance of the increased harmonic overtones or the independent mouth tones of a harmonic or inharmonic nature. A single exception was A. The order of resistance of the others was O, E, I, U.

B. *Diminution of the vocal pitch through solid objects and air.* The experiments in the above paragraph had been made on the street, and for these experiments a number of rooms in the Physiological Institute were selected. The doors were closed and covered with drapery. The results were the same.

C. *Diminution of pitch through porous media and through air.* The instrument was a violin. The order of investigation should be read in the original. It was also seen that the deep sounds of the violin could be heard at a greater distance than the high ones, which means that if the distance between the hearer and the player remains the same, the scale which is played with the same subjective force ascending from g of the g string up to g of the e string is perceived by the hearer in the form of a uniform decrescendo.

D. *Diminution of the vocal sounds through porous media and through air.* The same results were here obtained as in the experiments in air. In other words, the resistance of the vowel A is greatest, and the order of the others is O, E, I, U.

E. Experiments on the relation of the pitch (objective energy) and the intensity (subjective perception) from clang-tints. This must also be read in the original.

DREYFUSS.

397. The author noted the attraction curve of the legs of a frog, vertically suspended, upon a pendulum kymograph of Fick-Helmholtz. It was found that there were differences in the curve of the normal animal and of the animal deprived of its brain and spinal cord. The first is spoken of as the tonus curve, the latter as the "corpse" curve. After destruction of both labyrinths the "corpse" curve appears. In a destruction of one labyrinth, both legs gave a middle position between the tonus and "corpse" curve. The central nervous system was then removed in layers. The removal of the cerebrum increases the reflex, but on removal of the thalamus opticus the "corpse" curve appeared. It can practically be assumed that in the frog the paths leading from the end apparatus of the eighth nerve to the spinal cord must pass through the thalamus opticus.

DREYFUSS.

398. The peculiar observation that we may recognize the voices of our friends from the phonograph though our own voice sounds foreign, leads to the assumption that we hear our own voice through life differently—in other words, with a different clang-tint than that with which it is heard by others. The most probable explanation for this change in pitch is that the speaker does not perceive his own voice only through the air, but also through that part of the body intervening between the organs of speech and the cochlea.

EXNER has shown by a simple experiment that the kind and shape of the conducting substance has an influence on the clang-tint, which was of course previously known. The piece of wood is held between the teeth of the one intoning, and this is grasped by both hands. The observer from time to time takes the other end in his mouth and closes both his ears. If the extremity is tightly grasped with the teeth, the sound of the singer will seem quite different to observers than when the tones are only perceived with the ear closed and without contact with the teeth. Instead of grasping the wood with the teeth the observer may place the end on the skin over the thyroid cartilage.

DREYFUSS.

399. MOELLER after experiments on singers and on his own person comes to a conclusion contrary to Barth in the well-known physiological vocal experiment of Spies, which consists in humming a tune with closed lips. The sound becomes deeper on closing one half of the nose—and agrees with the opposite view of Guttman and Bukofzer. The fact that a variation in the pitch does not take place is explained by the involuntary attempts of the person examined to immediately regulate the pitch.

HAENEL.

GENERAL.

a.—REPORTS AND GENERAL COMMUNICATIONS.

400. **Grunert and Schulze.** Annual report of the University Ear Clinic in Halle, from April, 1902, to March, 1903. *A. f. O.*, vol. lix., p. 169.

401. **Spira.** Report of the Rhino-otological Department of the Jewish Hospital in Krakow in the first four months of its existence. *A. f. O.*, 1903, No. 8.

402. **Urbantschitsch.** Report of cases. *Wiener klin. Wochenschr.*, No. 45, 1903.

400. After the usual statistical data an exhaustive report of

interesting cases follows. In the first case, cholesteatoma with disease of the labyrinth, exact examination of the varying course of the disease after the operation and numerous exploratory operations did not show what intracranial complication caused the threatening symptoms. Presumably, a parietal thrombus was present which was not found at the operation on account of the severe bleeding. It is remarkable that notwithstanding the extensive disease of the labyrinth the tuning-fork C was heard increased on the deaf ear.

The second case was regarded as a spontaneous cure of a sinus thrombosis after the removal of the primary focus in the mastoid process and after evacuation of an extrasinuous abscess.

The third case was that of a child with a mild acute inflammation after broncho-pneumonia with cerebral symptoms simulating an otitic meningitis.

Of the eight fatal cases during the year, five are fully reported.

HAENEL.

401. In his report, the author recommends early paracentesis of the drum membrane in acute otitis media, and opposes the expectant treatment suggested by Zaufal and the reviewer as being dangerous and representing a step backward. It would seem that only those have a right to so severely criticise a method which represents the result of many years' observation on a large clinical material who have had personal experience with the method criticised. Inasmuch as the author has not had this, his opposition loses its force.

PIFFL.

402. 1. Rupture of the chorda tympani following an injection into the middle ear through the tube. The report of this case shows the impracticability of this procedure, and unquestionably a simple injection from the canal would have sufficed.

2. Emphysema of the drum membrane after cauterization. Two vesicles appeared on the drum membrane from elevation of the epithelium, one directly over the short process and the other in the lower posterior quadrant.

3. Chronic myringitis with division of the drum parallel to its surface. Severe cocaine intoxication.

These reports show what the ear will stand therapeutically. It, however, seems hardly wise to the reviewer that such publications should appear in a journal for the general practitioner.

WANNER.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

403. **Braunstein.** On the influence of the use of the telephone on the ear. *A. f. O.*, vol. lix., p. 240.
404. **Cagnola.** A case of toxic otitis produced by iodide of potash. *Arch. f. italiano di otol.*, etc., 1903, p. 1185.
405. **Gutzmann.** On the compensation of the senses. *Wiener med. Presse*, Nos. 46-49, 1903.
406. **Okunew.** On the frequency of the simultaneous affection of the ear, nose, throat, and naso-pharynx in soldiers. *Wojsko medyczny Szurnal*, vol. clxxix., pp. 80-90.
407. **Pollak.** Relation of the teeth to the ear. *Separat-Abdruck aus dem Handbuch von Dr. J. Scheff*, Vienna, 1902, Hölder.
408. **Bechterew.** On hallucinatory insanity in affections of the ear. *Monatsschr. f. Psychiatrie u. Neurologie*, vol. xiv., No. 3, Sept., 1903.
409. **Capgras.** Relations of one-sided diseases of the ear with hallucinations of audition. *Arch. de neurologie*, 1903, p. 500.
410. **Treitel.** Remarks on the paper of Dr. Alt on disturbances of the musical hearing. *M. f. O.*, 1903, No. 9.

403. This is the first time that this question has been investigated with the aid of a larger material. The examination included 160 officials and employees of the Munich Telephone Company, and consisted in the otoscopic condition, examination with the whisper, and the determination of the upper and lower tone-limits; the Weber, Schwabach, Rinne, and Gellé tests were made. The examination shows positively that with the aid of the new apparatus of the switch system the regular use of the telephone does not exert an unfavorable influence on the healthy ear. It also could not be shown that even on affected ears did the telephone exert an unfavorable influence, though the number of the persons examined is not sufficient to settle this point, in the author's opinion. Severe injuries to the one telephoning might result from electric discharge during showers; these injuries, however, should not produce permanent changes if properly treated. An exhaustion or diminution of hearing was noticed in no case even after a service of several hours. On the other hand, in almost all cases the person examined declared that the ear used in telephoning gained in hearing acuteness, at least for the telephonic speech. The assertion that the regular use of the telephone might cause an over-excitation of the nervous system is denied by BRAUNSTEIN. The author, however, recommends that before employing persons in the telephone service it should be seen that their hearing is normal.

HAENEL.

404. In a man, forty-one years of age, after the moderate use of iodine, symptoms of iodism appeared, which were especially marked in the case of the ear, with deafness, tinnitus, and vertigo. Otoscopic examination revealed an acute catarrhal otitis media, the watch not being perceived by bone-conduction.

The author believes that in this case the iodine not only exerted an irritating influence on the mucous membrane of the tympanum, but that iodine is to be regarded as an aural poison for the labyrinth, similar to quinine and salicylic acid. This was shown in the present case by the loss of bone-conduction.

RIMINI.

405. In exercising speech three senses are employed, namely, touch, hearing, and sight. The last is especially of great importance. In order to make use of it the mirror is necessary.

In the case of an hysterical woman, complete aphonia was caused to disappear upon demonstrating to the patient the movement of the vocal cords in a laryngeal mirror. The use of the mirror is especially of service in motor aphasia; its use is necessary in the formation of the sibilant sounds, inasmuch as the child gains feeling and sight. The mirror was also used with success in chiasm disturbances of speech and in stutterers. In all cases, it simply represents the employment of the normal compensation of senses.

The author recommends, especially in the training of deaf-mutes, the use of the eye, as Bezold has done. Unfortunately the examinations of deaf-mutes have all shown that they frequently suffer also from a disturbance of vision. In the deaf-mute institute in Berlin, 35.5% showed defects of vision; in 29%, astigmatism was present.

The fourth chapter treats of the deaf-mute blind. In these cases the sense of touch is the only way of education.

WANNER.

406. In a careful examination of 400 soldiers suffering from their ears, in 219 a chronic catarrh of the throat, of the nasopharynx, and of the tubes was found present. Moreover, 83 patients suffered from adenoid vegetations in the roof of the nasopharynx and in the proximity of the pharyngeal opening of the tube. Almost all the other soldiers suffered more or less from various affections of the nose and the pharynx, where the prophylactic treatment unquestionably prevented most ear diseases. The most suitable treatment of chronic submucous hy-

pertrophic rhinitis and pharyngitis in soldiers is cauterization and curettage. By this treatment the soldiers also gained in intelligence of appearance.

SACHER.

407. The relation between the teeth and the ear results more frequently from the proximity of the ramus of the lower jaw to the auditory canal (caries, fracture) on the conjoined nerve supply; especially the lower molar teeth produce distinct action upon the ear. By way of sympathy, carious teeth may produce an irritation of the tympanic plexus, and tropho-neuroses in the tympanum (exudative catarrh of the middle ear, suppuration). Of greater importance are the reflex neuralgias, nervous otalgias from carious teeth, and nervous dentalgia from the ear. Inasmuch as pain is frequently produced in intact teeth by affections of the ear, it would be well for the dentist to have some knowledge of the examination of the ear, and the author thereupon adds a short introduction on the examination of the ear.

BRÜHL.

408. The psychic disturbances which appear after diseases of the ear are carefully described by the author after a study of the literature and the report of two personal observations.

The psychosis which develops from a disease of the ear presents hallucination with subsequent disturbances of the senses in the other organs. The sick frequently preserve their personal criticism of the hallucinations. In other cases, the hallucinations are joined by symptoms of dementia, in which the origin of the hallucinations is sought by the patient in his surroundings.

The disease differs from the so-called hallucinatory insanity, inasmuch as the disturbances of sense develop first of all in one sense organ and later in the others. Changes in consciousness and disturbances of association of ideas are absent. Recovery depends upon the possibility of improving or correcting the fundamental ear disease.

KÖRNER.

409. A woman, fifty-nine years of age, suffered from typical melancholia, shortly after the menopause. In addition to horrible visions, auditory hallucinations were present. Curiously enough the threatening voices were only heard by the left ear. The ears were then examined. The right ear was normal, the left contained cerumen. After removal of this obstruction, the patient slept that night quietly for the first time, and in the following days the auditory hallucinations and all other symptoms of melancholia rapidly and completely disappeared. OPPIKOFER.

410. The author is of the opinion that in the monaural diplacusis not only the nervousness of the individual but also subjective changes in the ear are of importance etiologically. Such cases get well from treating the ear. PIFFL.

C.—METHODS OF EXAMINATION AND TREATMENT.

411. **Ricardo.** Illumination with acetylene gas in diseases of the ear and throat. *Arch. internat. d'otol.*, etc., 1903, p. 1244.

412. **Collet.** On salpingoscopy. *Lyon médical*, No. 46, 1903.

413. **Bruhl.** Aural syringe. *Die ärztliche Praxis*, 1903, Nos. 22 and 24.

414. **Okunew.** Pyoctaninum aurium and ceruleum in acute and chronic middle-ear suppuration. *Medizina*, September, 1892.

415. **Urbantschitsch.** On thigenol in diseases of the ear. *M. f. O.*, 1903, No. 11.

416. **Fink.** Aristol in rhinology and otology. *Die Heilkunde*, vol. vii., 1903.

417. **Stolz.** On scopolamin-morpho-narcosis. *Wiener klin. Wochenschr.*, No. 41, 1903.

418. **Bloch.** Narcosis with scopolamin in aural surgery. *La presse otolaryngologique Belge*, 1903, No. 12.

411. For those who cannot use electricity the acetylene lamp is recommended by Barthez as the source of illumination. It is easily managed, without odor and without danger.

OPPIKOFEK.

412. The author recommends the use of the Valentine salpingoscope for the more exact survey of certain parts of the nose, of the exposed maxillary sinus, and of the naso-pharynx.

OPPIKOFEK.

413. In order to avoid the reckless use of the aural syringe in ear diseases, the author mentions the dangers which may result from a non-aseptic irrigation of the ear. There are definite indications and contra-indications for the use of the aural syringe. The aural syringe may only be used when examination of the ear reveals its necessity. The author's syringe when not in use is preserved in absolute alcohol. BRÜHL.

414. After numerous bacteriological experiments which have shown the bactericidal action of pyoktanin preparations, the author has endeavored to make use of them clinically. Forty-nine cases were treated, of which thirty-seven were chronic purulent otitis and twelve acute purulent otitis. The substance was used in a watery solution and instilled in drops. The drops were employed twice daily. Unpleasant action of the

pyoktanin treatment consisted in inflammatory stenosis of the canal, pain in the ear, and headache. The yellow pyoktanin is the better, as it is less irritating and does not discolor the tissues so much and permits a better survey of the drum.

SACHER.

415. The author has employed thigenol in chronic middle-ear suppuration with varying result. In the acute purulent diseases of the ear, the anæsthetic action of the drug diminished the pain so that paracentesis could be avoided. Inflammations of the external canal were healed, and the eczema of the auricle was improved. In one case of chronic suppurative otitis media with cholesteatoma, the cholesteatoma, the suppuration, and the headaches were relieved. The drug was employed in a concentration of 10-20 per cent. in a solution of glycerine and alcohol; also in the form of a salve and as a powder.

PIFFL.

416. Fifty-five cases of nervous rhinitis were favorably treated by insufflating aristol into the maxillary sinus in chronic purulent otitis media. Aristol is better than boric acid.

BRÜHL.

417. As it is not possible to obtain uniform preparations of scopolamin which will counteract the poisonous effect of morphine on the respiration, this form of anæsthesia must remain on trial. The important agent is the morphine. The author concludes that the narcosis obtained by scopolamin-morphine cannot compare in any way with the ordinary inhalation narcosis, both as regards the depth or the regularity of the administration. Of 465 patients, about 309 could be anæsthetized by injection. All the others required inhalation. A mortality of 0.6 % is also not particularly encouraging. One patient exhibited a deep asphyxia, nine showed light grades of asphyxia, and cardiac weakness was frequently observed.

WANNER.

418. After a description of his procedure with scopolamin, the author believes that this form of anæsthesia has a favorable future.

BRANDT.

d.—DEAFMUTISM.

419. **Siebenmann.** Report on the anomalies of the labyrinth in congenital deafmutism. *Verhandl. der naturforsch. Ges. in Basel*, vol. xvi.

420. **Brühl.** The hearing of deaf-mutes. *Deutsche Ärzte-Zeitung*, 1903 No. 6.

421. **Vali.** On the value of hearing-exercises in deaf-mutes. *M. f. O.*, 1903, No. 11.

419. From recent anatomical investigations of ALEXANDER and SIEBENMANN it seems that the two vestibular saccules and the semicircular canal have no auditory importance, and that the site of perception for noises, as well as for tones, must be located in the cochlea, especially in Corti's organ.

A very frequent form of intra-uterine genesis of deafness and deafmutism is furnished by conditions of collapse in the labyrinth, which are carefully described. The causes for this are to be found in malproportion between the labyrinth, which is primarily too large, and the bony framework, which remains of natural size. BRÜHL.

420. This gives a literary survey and explanation of the hearing possessed by deaf-mutes by means of schematic drawings of the cochlea. The author examined with Hartmann 116 deaf-mutes in the deaf-mute school at Berlin. Of these, 9 could not be examined. Of the remaining 107, 44 % were born deaf; 43.9 % were totally deaf; 56.1 % had hearing remnants for tones; in 32.8 % these remnants could be used in instruction; and 20.5 % had hearing for words. The examination was conducted with the voice, with tones C, c¹, c³, c⁴, a¹-a², and Galton's whistle. BRÜHL.

421. The author has examined the deaf-mutes in the institute in Vác, who have been instructed by means of methodical hearing-exercises, after Bezold and Urbantschitsch, for one year. It was shown that pupils who at the beginning could only hear very poorly, after a year were all able to hear vowels. The pupils with vowel-hearing possessed in part hearing for words, and others also hearing for speech. The results, therefore, of the hearing-exercises can be regarded as favorable, and the author recommends hearing-exercises for deaf-mutes, after the combined Bezold-Urbantschitsch method to preserve and improve upon the remnants of hearing. PIFFL.

EXTERNAL EAR.

422. Gersuny. On a number of cosmetic operations. *Wiener med. Wochenschr.*, No. 48, 1903.

423. Heimann. Communication on artificial ear-drums. *La presse otolaryngologique Belge*, 1903, No. 11.

422. 1. Diminution of the auricle. GERSUNY resected a strip of the auricle running parallel to the helix out of the cartilaginous part extending from the lobule nearly to the insert of the

auricle. The auricle was thus diminished in size corresponding to the breadth of this strip. In order to approximate the auricle to the head, the incision is to be made so that the resected strip will be broader on the posterior surface than on the anterior. The same operation has been employed for malignant tumors of the auricle. The method is illustrated by a drawing.

2. Operation for prominent ears. Curved incision behind the auricle with complete detachment down to the auditory canal. From the posterior surface of the auricle a strip of variable breadth is resected and the auricle is attached to the periosteum by broad sutures.

3. Diminution of the nose. In regard to the injection of paraffin, the author believes that it is immaterial whether we use hard paraffin or paraffin ointment. It must not, however, be in a fluid condition.

WANNER.

423. HEIMANN observed that an artificial drum consisting of a thin layer of absorbent cotton was well borne by one ear without the recurrence of the otorrhœa. The purulent discharge, however, began directly upon inserting the artificial drum in the second ear. After this discovery, the author only places the artificial drum in one ear. He is unable to give an explanation for this remarkable condition, but thinks that possibly it is due to the ventilation of the middle ear.

BRANDT.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

424. Heine. On the treatment of acute otitis media. *Deutsche med. Wochenschr.*, No. 48, 1904.

425. Müller. On dry treatment of acute purulent otitis. *Deutsche militärärzt. Zeitschr.*, 1903, No. 9.

426. Alexander. On the treatment of acute periostitis of the mastoid process by constant heat. *M. f. O.*, 1903, No. 9.

427. Urbantschitsch. On the filling in of operative cavities with paraffin. *M. f. O.*, 1903, No. 9.

428. Heimann. On the medical treatment of acute otitis media. *La presse oto-laryngologique Belge*, 1903, No. 9.

429. Haug. On hemorrhagic otitis media in connection with the development of the upper anterior molar. *A. f. O.*, vol. lix., p. 318.

430. Barbillon. Septic infection of otitic origin in nurslings. *Revue mens. des mal. de l'enfance*, 1903, p. 487.

431. Vernieuwe. Contribution to the study of the anatomy of the mastoid apophysis. *La presse oto-laryngologique Belge*, 1903, No. 8.

424. Zaufal and his followers consider at present that acute otitis media frequently runs a cyclic course, and that it is possible in many cases to heal the disease by the application of warm compresses of acetate of aluminum without the usual paracentesis of the drum membrane, and without spontaneous perforation and evacuation of the secretion collected in the tympanum. HEINE does not deny that under certain conditions paracentesis may exert an unfavorable influence on the disease, inasmuch as access is given to streptococcic and staphylococcic infection through the artificial opening. These organisms, as is well known, are very much more malignant than the usual pyogenic agents in acute otitis media, namely, the diplococcus of pneumonia and the pneumococcus. On the other hand, if paracentesis be not practised, the patient may run considerable danger, as a thickened drum will cause the retained pus to travel toward the mastoid process and into the skull. He is therefore of the opinion that paracentesis should always be performed when the drum bulges, associated with pain and fever. Tenderness and periotitis of the mastoid process frequently tend to disappear if paracentesis has been performed. Irrigations from the canal and the air douche are unnecessary. It is sufficient to introduce a piece of sterile gauze loosely into the canal. NOLTENIUS.

425. MÜLLER's conclusions are as follows: A dry treatment is pleasant for the patient and easy for the physician; it fulfils the conditions; it gives the disease a mild and rapid course. It is applied as follows: A piece of sterile gauze is introduced to the depth of the canal and the ear is covered with compresses of gauze and a bandage. The dressing is changed in twenty-four hours; if the discharge is very free, more frequently. Of 301 cases treated by this method, 279 recovered, 18 were operated upon, and 4 were discharged unhealed, as they refused operation. BRÜHL.

426. ALEXANDER has treated acute inflammation of the mastoid with an apparatus recommended by Ullmann, after the principle of Leiter's coil. A result is only to be expected in recent cases where there is no profuse suppuration in the mastoid process. If the process is more advanced, the use of constant heat has only an anæsthetic action. PIFFL.

427. In two cases of tardy healing after operation for acute mastoiditis, the wound cavity was filled with solid paraffin in

order to stimulate the formation of granulations. In a short time the cavity closed.

In order to correct an introductory remark of the author, we wish to state that Zaufal has not recently employed the primary total suture after operations for acute mastoiditis. This was tried about ten years ago in a number of cases and with quite good results. To-day, in Zaufal's clinic only the partial primary suture is employed and the duration of healing is thereby decidedly shortened. This point has been especially mentioned by the author in his paper on the subject, based upon 68 cases. At the present day the list of cases is increased to 200.

PIFFL.

428. Owing to the general repugnance on the part of Poles to any surgical intervention, the author has been in the habit of treating acute otitis as follows: Leeches to the mastoid process; either iced or warm compresses—whichever was most agreeable to the patient; pain-relieving instillations into the auditory canal; large doses of salicylic acid; rest in bed, and diet. With this treatment, in 12 cases out of 48 paracentesis was found necessary. The duration of the disease was about 10 days. Of those cases not treated by paracentesis, 6 became chronic, 2 developed an inflammation of the mastoid, in 1 the disease was tuberculous. The drum membrane is only incised when this form of treatment is without result. The use of salicylic acid is very warmly recommended.

BRANDT.

429. In a young girl, twelve years of age, with a previously healthy ear, a typical acute hemorrhagic middle-ear exudation occurred simultaneously with toothache in an upper molar tooth and insignificant pain in the ear; after the formation of a hemorrhagic bleb on the gum, the pain was relieved, but could be reproduced by touching the site of the bleb. All of the symptoms disappeared except the subjective noises. After opening the hematoma, these also disappeared. Associating causes for this peculiar clinical picture are furnished by heart disease and chlorosis, the age of the patient—namely, the beginning of puberty,—and the hysteroneuropathic disposition.

HAENEL.

430. In nurslings which come to autopsy a purulent otitis is usually found. The catarrh of the stomach and of the intestines is a symptom of sepsis, originating in the ear. A diagnosis of

gastro-enteritis is made and treated, while the primary middle-ear suppuration is overlooked. OPPIKOFER.

431. VERNIEUWE gives five interesting horizontal sections through various mastoid processes, and with the aid of four clinical histories the various courses of an inflammation following an acute otitis media are described, according as the mastoid process is pneumatic or eburnated. In chronic suppurations, the anatomical structure of the mastoid process is also of importance, and complications from the side of the sinus are more easily explained in cases where the inflammation extends to the cells in the immediate proximity of the sinus, or in which defects are present in the bony walls of the sinus. BRANDT.

b.—CHRONIC PURULENT OTITIS.

432. **Compairod.** Chronic purulent otitis, with epithelioma of the middle ear and of the mastoid process. Radical operation and recovery. *Archivo Italiano di Otologia*, etc., vol. xiv., No. 4.

433. **Zaalberg.** On operations of the labyrinth. *M. f. O.*, 1903, No. 10.

434. **Aspissow.** A case of rupture of the internal carotid artery in disease of the middle ear. *Wojenno med. Shurnal*, October, 1903.

432. The radical operation was undertaken in a patient thirty-six years of age, and particles of the tumor were removed from the middle ear, attic, and antrum, which proved to be epithelioma on examination. The case healed.

RIMINI.

433. After describing the indications given by Jansen and the various methods for the operative opening of the labyrinth, an interesting case of a labyrinthine inflammation is given, which followed inadvertent opening of the horizontal semicircular canal during the radical operation, and which was finally cured by the removal of the semicircular canals and opening of the vestibule. The cochlea was not opened. PIFFL.

434. The patient, a young soldier, suffered from chronic otorrhœa for seven years. There was a total defect of the drum and of the ossicles. Examination with the probe revealed bare and rough bone. A few days after admission to the hospital, the facial nerve on the affected side became paralyzed. Two days before the first bleeding, the temperature rose to 39° C. During the hemorrhage, blood escaped from the ear in a stream as thick as the small finger, with distinct pulsation. During the

attempts at checking the bleeding with packing, the patient lost about a litre of blood. During the next few days, the hemorrhage recurred in slight quantities. The autopsy showed acute purulent meningitis, tuberculous meningitis, chronic suppurative otitis media, acute purulent osteomyelitis and caries of the petrous pyramid, rupture and arteritis of the right internal carotid, septic pyæmia. The hemorrhage was produced by the complete carious destruction of the wall intervening between the drum cavity and the carotid canal. The internal carotid was destroyed to a large extent, so that the two extremities were quite far apart.

SACHER.

C.—CEREBRAL COMPLICATIONS.

435. **Beco.** A case of abscess of the temporal lobe following old otorrhœa. *Annales de la société méd-chirug. de Liège*, 1903, p. 535.

436. **Kissel.** A case of brain abscess, in the temporal lobe of a child, of otitic origin. Death. Autopsy. *Djetskaja Medicina*, 1903, No. 2.

437. **Cheval.** Oto-laryngological clinic of the St. Pierre Hospital. Introductory lecture. *La presse oto-laryngologique Belge*, 1904, No. 1.

438. **Konietzko.** The pathological examination of a case of middle-ear tuberculosis, beginning cholesteatoma, and tuberculous meningitis. *A. f. O.*, vol. lviii., p. 206.

439. **De Stella.** Two cases of acute purulent otitis media with endocranial complications. *Arch. internat. d' otologie*, etc., 1903, p. 1220.

440. **Donath.** On the diagnostic and therapeutic value of lumbar puncture. *Wiener klin. Wochenschr.*, No. 49, 1903.

441. **Schulze.** On the dangers of ligating the jugular vein and occlusion of the sinus in otitic sinus thrombosis. *A. f. O.*, vol. lix., p. 216.

442. **Luc.** Aural pyæmia without sinus thrombosis. *La médecine moderne*, Paris, 8th year, No. 55.

443. **Francis Huber.** Otitic serous meningitis; lumbar puncture; recovery. *American Medicine*, New York, Dec. 5, 1903.

444. **Goldstein.** An unusual case of spontaneous bilateral hemorrhage from the middle ear. *The Laryngoscope*, St. Louis, August, 1903, p. 577.

435. An abscess in the temporal lobe following chronic middle-ear suppuration in a child seven years of age. The abscess was opened and drained. Five and a half months later, apparent recovery. Eight months after operation severe symptoms of brain abscess recurred. Autopsy revealed a second abscess in the temporal lobe which had perforated into the lateral ventricle and led to purulent meningitis.

OPPIKOFER.

436. The fulminating clinical picture was regarded during lifetime as an encephalitis of infectious origin. At autopsy a

bilateral purulent otitis and an abscess in the right temporal lobe were found.

SACHER.

437. A case of severe brain abscess is reported which is interesting on account of the multiplicity of the abscesses and on account of the great distance of the second abscess from the original one in the temporal lobe (in the centre of the fissure of Rolando).

BRANDT.

438. Tuberculous disease of the entire middle-ear mucous membrane, extensive infiltration in the attic, in the floor of the tympanum, and in the proximity of the stapes. The membranes of the windows and of the labyrinth were intact. The following condition of the drum is unusual: The epidermis passes through the central perforation over the mucous membrane of the drum, which is tuberculous and without epithelium, and sends off irregular strings of cells into the granulation tissue (beginning cholesteatoma).

HAENEL.

439. Case 1. Left acute purulent otitis in a boy nine years of age; perisinusitis and Bezold's mastoiditis. Operation, recovery.

Case 2. A boy four years of age; acute purulent otitis, perisinusitis, purulent sinus thrombosis, subdural abscess over the cerebellum. The sinus was operated, also the subdural abscess. Death. No autopsy.

OPPIKOFER.

440. This article is very readable and presents two cases of otitic meningitis of interest for the specialist. In one individual, after the puncture the pain disappeared, while opening the mastoid process exerted no favorable influence in the other case. Puncture was performed three times at long intervals and a purulent fluid was always found. With each puncture the symptoms were relieved.

In acute meningitis, lumbar puncture may be performed every day at one or the other interarcual space, until the fluid proves to be normal. Puncture is furthermore recommended in brain abscess which is not localizable or is difficult of access. Sterilized salt solution at the body temperature is injected with a syringe and the dural sac thus irrigated; the quantity made to equal the evacuated liquor or measure up to 30ccm. Diagnostically the presence of many lymphocytes and polynuclear leucocytes cannot be regarded as pathological.

WANNER.

441. The dangers of ligating the jugular consist in disturbances of the circulation by obstruction of the blood current. The circulation is then taken care of by the venous channels of the opposite half of the skull, the collateral tracts of the same side, the facial vein, and the external jugular vein. In order to preserve the facial vein for the collateral circulation, the ligation should be undertaken, if possible, above its entrance into the jugular vein. The condition of the cranial sinus is also of importance for the regulation of the blood flow. If the sinus is not obstructed, the emissaries will carry off the blood. Upon thrombosis of the sinus, the degree of congestion depends upon the site of the thrombus. Dangerous disturbances of the circulation have been rarely met with up to the present time. In these cases there has always been an anomaly in the size of the sinus, usually an abnormal narrowness of the sinus of the healthy side, or a bilateral obstruction of the sinus or of the internal jugular vein.

Bilateral occlusion of the sinus does not necessarily cause death, as has been shown by a case observed in the Halle clinic, in which the threatening symptoms — absolute coma, motor irritation — disappeared gradually on the second day. In the fatal cases, congestive hyperæmia, œdema, and congestive necrosis of the brain are found, as well as capillary and even extensive hemorrhages in the brain and in the cranial membranes. The view of Hölscher—that if the sac is opened the conditions for the restoration of circulation are more favorable—was confirmed by the material collected by Schulze.

Typical signs for the presence of a dangerous asymmetric development of both sinuses are not known. The dread of ligating the jugular in a case of asymmetric sinus-formation does not enter into account with the many favorable results of this operation. If, however, we have determined that an occlusion of the main venous channel of the opposite side is present, the operation must be undertaken according to each case. In an obstructed sinus-thrombosis which up to the present time has not shown any disturbance of the circulation, it can be expected that a jugular ligation can be undertaken without being followed by any circulatory disturbances.

HAENEL.

442. Two typical cases of pyæmia without sinus phlebitis. In the one case, metastases formed in the various joints; as the symptoms of mastoid empyema were absent, a-paracentesis alone was performed. Recovery. Finally the differential diagnostic

points between pyæmia with and without sinus thrombosis are given.

RIMINI.

443. Child, aged two. Fourteen days before admission to hospital, child became restless. Four days before admission, general convulsions began, occurring every thirty minutes. Commencing with a loud cry, child would fall. Movements were both tonic and clonic. The attacks lasted about three minutes. Occasional vomiting after an attack, or the child would cry and fall asleep. The convulsions occurred night and day and were brought on by any external irritation. Examination, January 8th. Face suffused, expression dull. Child is apathetic and semi-conscious. Extremities cold and blue. Surface is mottled. Tongue coated and moist. Eyes: convergent strabismus and moderate lateral nystagmus. Pupils dilated, the right most; contract with light moderately, then slowly dilate and again contract. *Tâches cérébrales* are easily produced. An offensive purulent discharge from the right ear. No tenderness or œdema over the mastoid region or side of skull. Pulse rapid and regular. Exaggerated reflexes. January 11th, mastoid opened, but not the dura. The same day lumbar puncture was performed; 30g of spinal fluid withdrawn. Little change. January 12th: Sixteen grams more fluid taken away. The symptoms gradually improved, and the patient was discharged February 2d, twenty-two days after operation. Two months later, was perfectly well.

W. S. BRYANT.

444. The patient was under careful observation for over one year, and there was no malingering. The hemorrhage was independent of the menstrual function. Miss X., white, age twenty-two; hysterical; good family history. February, 1902, with an hysterical attack she had pain and bleeding in both ears. The left ear soon stopped. The right continued to bleed more or less for eleven months. The fluid from the case appeared microscopically to be serum containing a little blood. It did not coagulate. Both membranes were intact and normal. Headache or sense of pressure just before the attack came on. The discharge occurred at regular intervals, at first every half hour. When the patient was under some nervous excitement, it was more frequent and abundant. The amount of fluid was about 1cc at a time. The discharge was more frequent by night and in the recumbent position. Four days after Dr. GOLDSTEIN saw the patient, the discharge from the left ear ceased. The other ear

continued to discharge for five weeks without an intermission of more than eight hours. The patient's blood count was: red, 3,000,000; white, 5000. The bleeding point was not located more definitely than that it was near the juncture of the posterior wall and membrane. The fluid suddenly welled up in the canal while it was under observation. The discharge was gradually decreased, but the pads of cotton worn over the ear were often soaked with the discharge. There was an exploratory incision of the tympanum done and packing without any result. Patient gained in weight in spite of the discharge. There was no evidence of inflammation, rise of temperature, or serious symptoms. Cure was accomplished by radical suggestion, and no recurrence for six weeks at the date of writing.

W. S. BRYANT.

(To be concluded.)

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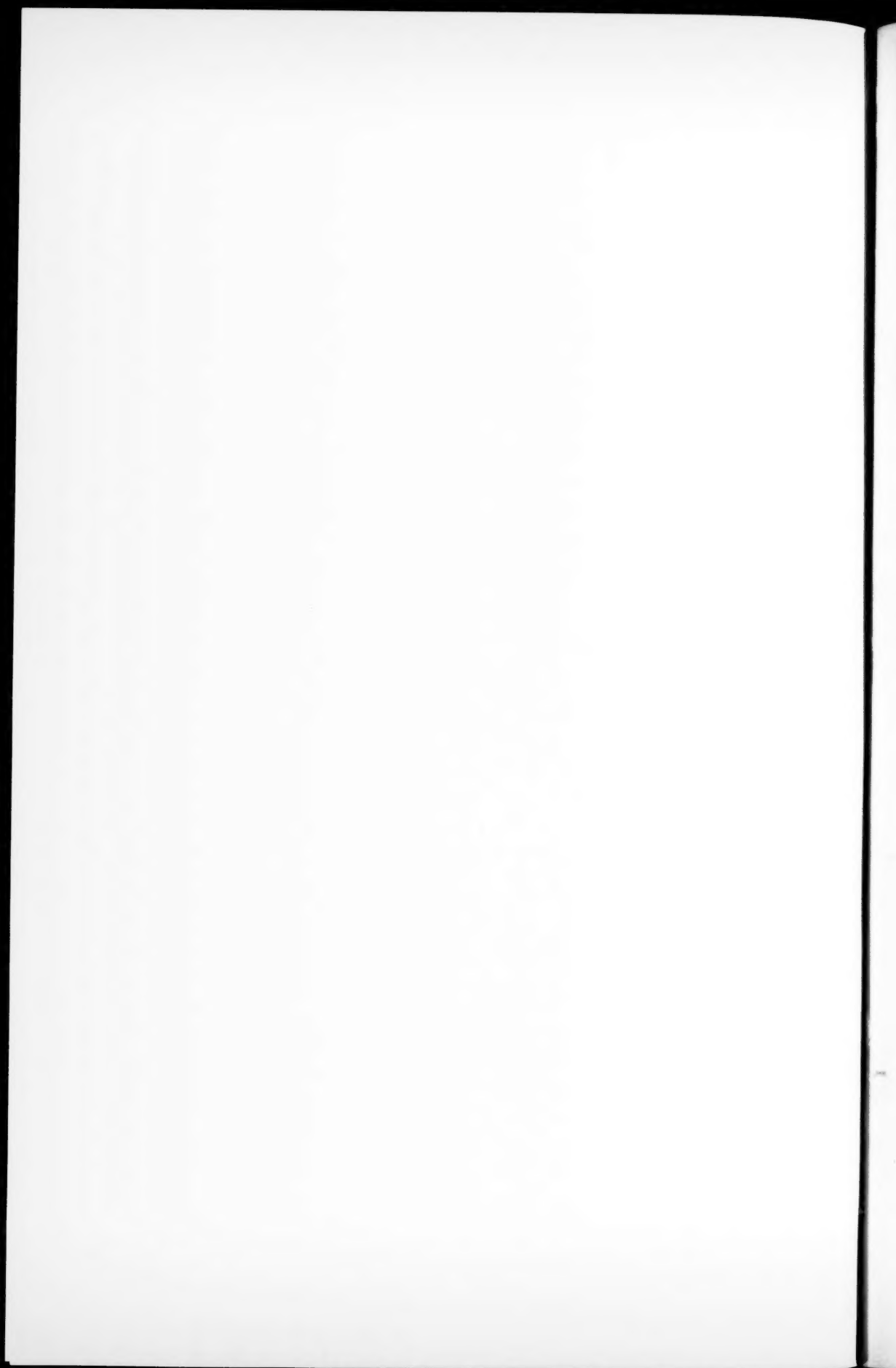
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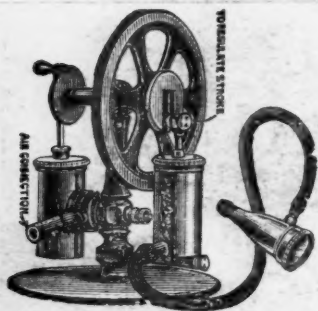
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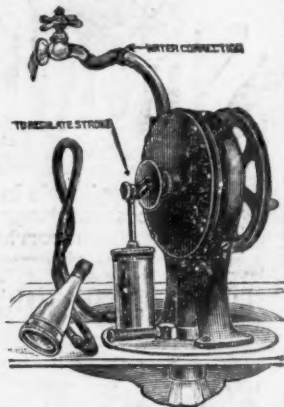
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